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LOYOLA UNIVERSITY CHICAGO

PERSONAL AND CONTEXTUAL RESILIENCE FACTORS AND THEIR
RELATIONS TO PSYCHOLOGICAL ADJUSTMENT OUTCOMES ACROSS THE
LIFESPAN: A META-ANALYSIS

A DISSERTATION SUBMITTED TO
THE FACULTY OF THE GRADUATE SCHOOL
IN CANDIDACY FOR THE DEGREE OF
DOCTOR OF PHILOSOPHY

PROGRAM IN COUNSELING PSYCHOLOGY

BY

KRISTEN E. LAMP

CHICAGO, ILLINOIS

AUGUST 2013

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ACKNOWLEDGEMENTS

Throughout the completion of this project, I have been grateful for the support of several faculty members, mentors, and supervisors. My dissertation chair and research mentor, Dr. Steven Brown, has provided immense support for my growth as a researcher. Throughout our collaborations, I have learned about best practices in research design and thoughtful analysis of both data and the broader research literature. My critical thinking and ability to engage independently in research have grown as a result. Dr. Elizabeth Vera has also supported my growth as a researcher and helped me to build confidence in communicating my ideas and advocating in professional contexts. Dr. Eunju Yoon helped me to consider the logistical components of meta-analysis in light of current definitions and operationalizations of my variables. This project has been strengthened by their feedback, and I am thankful for the opportunity to work with this talented committee. I am also thankful for the support and mentorship I received in clinical settings from Dr. Kelly Maieritsch and the staff at the Hines VA Hospital Trauma Services Program. Under their mentorship, I grew as a clinician, researcher, and person in my abilities conduct meaningful research and engage in clinical practice. I would like to thank the staff of the VA Ann Arbor Healthcare System PTSD Clinical Team for helping me to continue my professional growth and development in these areas. Finally, I am thankful for my husband, family, close friends, and teammates for their support, humor, and ability to make life such an enjoyable adventure.

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ABSTRACT

Research concerning resilience following trauma and adversity indicates that resilient adaptation occurs more often than originally hypothesized. Correlational studies have identified resilience factors including social support, self-efficacy, self-esteem, spirituality, and optimism. However, these studies have evidenced mixed findings regarding the relationships between resilience factors and adjustment outcomes including adjustment to trauma, psychological adjustment, and posttraumatic growth. In the present study, definitions and concepts in resilience research were clarified, and findings from the past five decades of lifespan resilience research were reviewed. A meta-analysis designed to summarize the existing research and uncover the true nature of the relationships among resilience factors and positive adaptation outcomes among adult trauma survivors was conducted. Findings revealed positive and significant meta-analytic correlations between resilience factors and adjustment outcomes, with the exception of a negative and significant relationship between spirituality and trauma adjustment. All mean effect sizes, with the exception of the relationship between optimism and trauma adjustment, were moderated by demographic, methodological, setting, trauma type, and time since trauma variables. Discussion of these findings focused on embedding the results within current theoretical perspectives, identifying clinical and counseling implications, addressing limitations, and clarifying directions for future research.

CHAPTER ONE

INTRODUCTION

Over the course of the past five decades, a rich and continually evolving body of literature has investigated the process of resilient adaptation in the face of adversity (Masten, 2011; Luthar, 2006). Initial studies of individuals facing challenging life circumstances were based on the premise that adversity would not only place individuals at risk for developing psychological disorders, but would also reliably predict maladjustment (Cicchetti & Toth, 2009). Emerging findings from these studies indicated that these hypothesized predictions were much more nuanced and complex than originally conceptualized (Rutter, 2007). Research began to show that certain populations of at-risk youth facing conditions including socioeconomic disadvantage (e.g., Garmezy, Masten, & Tellegen, 1984; Werner, 1994), maltreatment (Kim & Cicchetti, 2010), and racial discrimination (Arbona & Coleman, 2008) went on to become academically successful, socially competent, and emotionally adjusted adolescents and adults. Similarly, studies of adults who experienced traumatic life events began to indicate that a sizeable population of trauma survivors went on to report emotional adjustment and positive social relationships (Hoge, Austin, & Pollack, 2007; Bonanno, 2008). Across these early studies, a key finding emerged: at-risk individuals

who went on to demonstrate positive adjustment appeared to outnumber those who evidenced greater difficulty. Positive adjustment in the face of adversity appeared to be a common experience rather than an anomaly.

This observation has been echoed in subsequent epidemiological studies focusing on individuals' responses to stressful or traumatic life events. These studies conceptualize traumatic life events as instances of witnessing or experiencing an event which both endangered one's own life or the lives of others and led to a sense of intense fear, helplessness, or horror. Commonly measured responses to trauma include development of symptoms which met criteria for posttraumatic stress disorder (PTSD), depression, substance use disorders, and other indices of maladjustment as defined in the most recent edition of the Diagnostic and Statistical Manual for Mental Disorders (DSM-IV; American Psychiatric Association, 1994). Assessing responses to trauma affords a unique opportunity to measure responses to adversity in the context of severe risk. In their analysis of data collected from a nationally representative sample during the National Epidemiologic Survey on Alcohol and Related Conditions (NESARC), Roberts et al. (2011) found that approximately 79.7% of respondents reported experiencing or witnessing at least one adverse traumatic event in their lifetimes. Of the participants reporting a trauma history, 9.1% went on to develop symptoms of PTSD (Roberts et al., 2011). A separate analysis of the NESARC dataset found that approximately 6.4% of the total sample reported symptoms consistent with PTSD (Pietrzak et al., 2011). These findings are consistent with previous epidemiological studies, including the National Comorbidity Survey (Kessler et al., 1995). This study of a nationally representative

sample found that approximately 50-65% of respondents reported experiencing at least one traumatic event, with approximately 7.8% of these trauma survivors going on to report symptoms of PTSD. Reviews of the literature indicate that even among groups traditionally considered to be at high risk for maladjustment, such as assault survivors, PTSD prevalence findings rarely exceed 30% of the sample (Bonanno, Brewin, Kaniasty, & LaGreca, 2010). Similarly, reviews have found that groups experiencing chronic life stressors which do not meet criteria for traumatic events at first glance (e.g., growing up in a household reporting a low socioeconomic status), fewer than half of respondents tend to report maladjustment (Rutter, 2012). Given these findings, it appears that a majority of individuals facing adverse or traumatic life circumstances are able to adjust and function adaptively over time. Furthermore, this finding appears consistent across studies of youth, adolescent, and adult survivors of adversity and trauma (Bonanno et al., 2010; Hoge, Austin, & Pollack, 2007; Masten, 2001).

The finding that individuals facing adverse circumstances often show positive adjustment over time has become the focus of a broad body of literature concerning resilience in the fields of counseling, clinical, and developmental psychology (Arbona & Coleman, 2008). A substantial portion of this literature has been devoted to defining the dynamic concept of resilience and describing the pathways through which it relates to adjustment following adversity.

Defining Resilience

Definitions and conceptualizations of resilience have varied greatly throughout the literature, sparking confusion and controversy concerning the true meaning of the

term. Early conceptualizations of resilience depicted a trait inherent to individuals who were able to succeed in adverse situations (Arbona & Coleman, 2008). Resilient individuals were often described as “invulnerable or invincible” (Pine, 1975, as cited in Masten, 2001, p. 227), and their ability to overcome trying circumstances was seen as unusual and remarkable. This initial understanding of resilient character traits was refined by Block & Block (1980) in their conceptualization of ego resiliency, which they described as a “dynamic capacity to contextually modify one’s level of control in response to situational demands and affordances” (Letzring, Block, & Funder, 2005, p. 396). They noted that individuals with this capacity were often characterized by a set of personality traits including consistency, flexibility, sociability, adaptability, and inventive use of resources to attain goals (Block & Block, 2006). Later researchers further refined the concept of resiliency as a personal trait by investigating the construct of resilient personality (Skodol, 2010). The resulting literature depicted resilient individuals as those capable of flexibly and adaptively using such internal resources as insight, esteem, confidence, hardiness, empathy, and sociability to aid in the process of positive development (Skodol, 2010).

While useful in guiding the initial theory of individual traits related to adjustment, the constructs of ego resiliency and resilient personality have received several theoretical critiques. Notably, emerging studies which outlined personal characteristics of resilient individuals did not fully account for the myriad influences of contextual factors which could facilitate or impede adaptation in trying circumstances (Rutter, 1985, 2012; Arbona & Coleman, 2008). Further, the constructs of ego resiliency and resilient personality did

not consider adaptation in the context of risk processes (Arbona & Coleman, 2008). Instead, they focused on the development of an adaptive personality. As a result, resilience was seen as a set of personal traits, and the process of adapting to adversity was depended solely on the individual (Rutter, 1985; Ungar, 2004). Resilient individuals were seen as those who were able to adjust to stress while vulnerable individuals were not. In this view, however, the interactions between individuals and their sociocultural environments during the process of resilient adaptation were overlooked (Rutter, 1985). Insight into broader systemic influences on resilient development in the face of adversity was needed.

Research efforts began to shift toward identifying both individual and contextual influences on adjustment and maladjustment in the presence of adversity. Moving beyond the initial conceptualizations of ego resiliency and resilient personality, more recent definitions of resilience have described a set of protective factors (Rutter, 1985) which occur naturally within individuals and their sociocultural environments (Masten, 2001), evidence variability depending on social, cultural, and environmental factors (Ungar, 2004), and enhance adaptive development in the face of adversity (Luthar, Cicchetti, & Becker, 2000). According to this viewpoint, resilient adaptation is a developmental process rather than a personality trait (Rutter, 2007). As such, it is conceptualized as the flexible use of personal, social, cultural, and environmental resources in the process of responding to stress (Luthar, Cicchetti, & Becker, 2000). Defined in this way, the resilience process accounts for not only personal and individual traits, but also broader social and cultural supports as tools for adapting to changing

stressors and environmental demands over time. The protective factors which operate within the process of resilient adaptation tend to relate to positive adjustment outcomes, including competence with developmentally appropriate life tasks (Masten, 2001) and psychological health (Davydov, Stewart, Ritchie, & Chandieu, 2010). For the purpose of the present study, resilience is defined as a dynamic developmental process of adaptation in the face of adverse circumstances involving use of a flexible combination of internal competencies and contextual supports to aid in adjustment. This definition alludes to two key components of resilience: (1) the presence of adversity or risk, and (2) the ability to use both internal competencies and contextual supports to achieve positive adaptation.

Adversity has been conceptualized as significant, severe, or traumatic threats to an individual's ability to function (Luthar, Cicchetti, & Becker, 2000; Luthar, 2006). Given this broad definition of adversity, resilience researchers have focused their studies on both chronic life stressors (e.g., low socioeconomic status communities; Garmezy, Masten, & Tellegen, 1984) and traumatic life events (e.g., community survivors of natural disasters; Bonanno, Brewin, Kaniasty, & LaGreca, 2010). While studies of chronic life stress contribute vital findings and theoretical insights to the field of resilience research, the present study of adult resilience will focus on adaptation in the context of trauma in order to uncover resilience processes among populations experiencing severe risk.

Risk factors have been defined as variables that have been shown to place individuals at a greater risk for experiencing maladjustment following adversity (Brewin, Andrews, & Valentine, 2000; Ozer, Best, Lipsey, & Weiss, 2003). Cross-sectional

studies of risk factors as predictors of maladjustment have identified a multitude of demographic, intrapersonal, social, and environmental variables which relate reliably to indices of maladjustment. Notable risk factors include female gender, racial and ethnic minority status, perception of trauma as severely threatening, lack of access to resources, history of adversity, difficulty coping, and lack of social support (Brewing, Andrews, & Valentine, 2000; Ozer, Best, Lipsey, & Weiss, 2003). Longitudinal studies of risk factors have underscored the ability of each variable to predict maladjustment while also noting some variation among different sociocultural environments over time. These findings have led to the conclusion that the interactions among risk factors and socioenvironmental challenges yield broader risk processes (Rutter, 1985, 2007). The body of literature identifying the links between risk processes and maladaptive outcomes has greatly informed the diagnosis and treatment of pathology including PTSD, depression, substance use disorders, and other related conditions (Davydov et al., 2010; Nemeroff et al., 2006). More recently, studies investigating adaptive outcomes have sought to add to the understanding not only of pathology, but also of adjustment processes and the concurrent development of resilience promoting interventions.

Positive adaptation has been defined as meeting external criteria for adaptive functioning (e.g., academic achievement, social competence) or reporting internal signs of adaptive functioning (e.g., subjective well-being; Masten, 2001; absence of symptoms; Davydov et al., 2010; posttraumatic growth; Tedeschi & Calhoun, 2004) which are developmentally and culturally appropriate to the individual (Masten & Coatsworth, 1998; Arbona & Coleman, 2008). Within the adult resilience literature, care has been taken to

define and distinguish each of these potential adaptive outcomes and their course over time, beginning in the immediate aftermath of trauma. Shortly following a traumatic event, a majority of individuals report symptoms consistent with maladjustment. These initial symptom ratings tend to follow a fairly predictable course. After approximately 3 months, initial symptom ratings drop substantially and tend to stabilize, with fewer than half of respondents reporting maladjustment (Resick, Monson, & Rizvi, 2008). Among those who report continued maladjustment, symptoms could either become chronic or enter a recovery phase resulting in a return to adaptive functioning (Bonanno, 2004, 2008). Among those who report adjustment, resilient functioning may emerge. Resilience involves functioning more adaptively than would be expected given the severity of the trauma. Resilient functioning goes beyond a simple absence of symptoms to describe adaptation without necessarily requiring superior functioning (Rutter, 2012). However, superior functioning following trauma may also be possible. Among trauma survivors reporting adjustment, some may go on to experience posttraumatic growth (PTG; Tedeschi & Calhoun, 2004). PTG has been defined as the process of personal growth and heightened adaptation following trauma. While this phenomenon has been widely debated within the literature (e.g., Frazier & Kaler, 2006), studies of PTG have yielded evidence of self-reported growth following adversity, particularly among members of Western cultures (Johnson, Hobfoll, Hall, Canetti-Nisim, Galea, & Palmieri, 2007).

The internal competencies and contextual supports which combine to facilitate adjustment in the face of adversity have been the focus of early inquiry and remain the

subjects of ongoing study. Within the body of research concerning the ways in which resilience factors facilitate adjustment, specific types of resilience factors have been identified and studied. Specifically, promotive factors which relate directly to adjustment outcomes have been identified, and protective factors which moderate these relationships have been explored (Luthar et al., 2000). Findings have indicated that individuals who engage in resilient adaptation tend to display certain individual characteristics such as self-efficacy and self-esteem, social competencies such as social support, and flexible use of environmental resources while coping, which together act as protective processes in the context of risk (Rutter, 2012).

Given the complex definitions of resilience, adversity, risk, positive adaptation, and resilience factors, the phenomenon of resilient adaptation tends to be inferred in the literature rather than directly measured (Rutter, 2007, 2012). Instruments have not been created to assess resilience when it is defined and conceptualized as an adaptive process. Instead, inferences of resilient adaptation have been made when measures of specific resilience factors relate positively to adjustment outcomes in the presence of risk, adversity, or trauma (Luthar, 2006).

Overview of the Resilience Research

The resulting body of research on resilient development began approximately five decades ago with the study of at-risk children. In the intervening years, four waves of resilience research have contributed valuable insights concerning the nature of the resilience construct among youth. As a whole, this body of research has produced a robust set of valuable findings. Across the waves of inquiry, resilience factors such as

self-esteem and social competence have been identified, and main effects relationships with positive outcomes have been uncovered (Masten, 2001), suggesting promotive functions of these factors. Protective factors which moderate these relationships, such as supportive interactions with adult caregivers, have also been studied (Masten & Coatsworth, 1998). Based on these data, preventive interventions have been developed and evaluated with an eventual goal of synthesizing findings across multiple systems and levels of development (Luthar et al., 2000). Efforts to synthesize these findings have largely been embedded in Ecological Systems Theory (Bronfenbrenner, 1977). This theoretical perspective posits that development occurs not only within an individual as a result of neurobiological characteristics and personality, but also within the context of broader systems of development. These systems include social groups (e.g., family, peers), communities (e.g., neighborhoods), and the broader sociocultural environment (e.g., cultural norms, laws). Within these individual and contextual systems, risk and resilience factors interact in dynamic, reciprocal processes to influence adaptation in the context of adversity (Waller, 2001).

Within the youth resilience literature, systemically informed research efforts concerning resilience have resulted in a largely coherent body of findings (Luthar, 2006). While some variability continues to exist in studies of resilient functioning among youth over time, a reliable set of individual, social, cultural, and environmental protective and promotive factors have been related to positive youth adaptation in the context of risk. With the advent of the psychological diagnosis of posttraumatic stress disorder (PTSD) in the 1980s, researchers expanded the scope of this literature to include the study of adult

survivors of trauma (Bonanno, Brewin, Kaniasty, & LaGreca, 2010). Findings from these studies, however, remain somewhat ambiguous.

Initial studies of adult trauma survivors focused primarily on identifying and conceptualizing factors which place trauma survivors at risk for psychopathology. Two meta-analyses of these risk studies have reliably identified relationships among risk factors and the development of PTSD in populations of adults exposed to traumatic events (Brewin, Andrews, & Valentine, 2000; Ozer, Best, Lipsey, & Weiss, 2003). Within these meta-analyses, risk factors included demographic variables (e.g., female gender, minority racial and ethnic background), peritraumatic variables (e.g., trauma severity as measured by perceived life threat, peritraumatic dissociation), and contextual variables (e.g., trauma history prior to the traumatic event, life stress subsequent to the traumatic event; Brewin, Andrews, & Valentine, 2000; Ozer, Best, Lipsey, & Weiss, 2003). While these two meta-analyses focused on the maladjustment outcome of PTSD, subsequent studies have also examined outcomes including depression, posttraumatic grief, and substance abuse (Bonanno et al., 2010), with some attention to differing courses of symptoms (e.g., delayed onset, Dickstein et al., 2010). Across these studies, lack of social support emerged as a robust predictor of maladjustment following trauma. This finding, in particular, has led to the question of whether or not the presence of social support or other resilience factors would relate to positive adjustment outcomes following trauma.

Given the robust and reliable correlations among risk factors and maladjustment, researchers turned toward identifying resilience factors which might relate to adjustment

after adversity. Initial studies investigated whether or not reducing risk factors would lead to resilient functioning. However, since resilient functioning has been described as a process of adjustment leading not only to a lack of psychological symptoms, but also to a presence of overall psychological functioning, resilience cannot be achieved solely by reducing identified risk processes (Bonanno, 2004, 2008; Rutter, 1987). Instead, resilience is achieved in a process of using both personal and sociocultural promotive and protective factors to aid in adjustment. Since few studies distinguish between promotive and protective factors, the term resilience factors will be used as an umbrella term to depict these constructs in this study. While some identified resilience factors mirror risk factors (e.g., social support as a resilience factor, King, King, Fairbank, Keane, & Adams, 1998; and lack of social support as a risk factor, Brewin, Andrews, & Valentine, 2000), most resilience factors are not simply the reverse of risk factors, since reducing risk alone does not confer resilience (Rutter, 1987). Instead, the variables that promote resilient functioning represent unique constructs that emerged during the study of adaptation to stress (e.g., coping self-efficacy; Benight & Bandura, 2003) and relate to positive functioning in the context of adverse or traumatic circumstances (Rutter, 1987).

In adult populations, several resilience factors have been identified and investigated. Individual resilience factors including internal locus of control, coping self-efficacy, self-esteem, psychological hardiness, emotional self-regulation, hope, optimism, spirituality, cultural identity, active coping style, and the ability to express and experience positive emotions have been identified and related to positive adjustment following trauma (Bonanno, Brewin, Kaniasty, & LaGreca, 2010; Bonanno, Galea, Bucciarelli, &

Vlahov, 2007; Ong, Bergeman, & Chow, 2010; Skodol, 2010; Masten & O'Dougherty Wright, 2010; Hoge, Austin, & Pollack, 2007; Dutton & Greene, 2010; Pargament & Cummings, 2010). Social resilience factors including both perceived and received social support from a variety of sources were strongly and reliably related to posttraumatic adjustment as well (Helgeson & Lopez, 2010; Bonanno et al., 2010). Additionally, community resilience factors including a sense of trust, cohesion, common goals (Hall & Zautra, 2010), and culturally sensitive community programming (Castro & Murray, 2010) have been related to positive posttraumatic adaptation. Given these findings, it appears that a variety of individual, social, and contextual resilience factors are related to adjustment among adult trauma survivors. Together, these resilience factors operate simultaneously across ecological systems as individuals appraise their experiences, formulate their reactions, and interact with their social groups and communities in an effort to cope with the aftermath of trauma (Agaibi & Wilson, 2005).

Resilience Factor Correlates of Resilient Adaptation Among Adults

Within the literature concerning resilient adaptation among adults, some of the most reliably and commonly investigated resilience factors include social support, self-efficacy, self-esteem, spirituality, and optimism.

Social support. The construct of social support has been variously defined and researched throughout the years (Guay, Billette, & Marchand, 2006; Helgeson & Lopez, 2010). Reviews of this research have described social support as a multifaceted phenomenon involving positive interpersonal interactions (Helgeson & Lopez, 2010).

Within the context of stressful or traumatic life events, social support research has largely

focused on the ability of supportive social networks to promote positive adaptation in times of stress. Research reviews concerning the relationship between social support and adjustment have described a strong, positive correlation between these constructs across multiple empirical studies (Helgeson & Lopez, 2010). Research efforts have sought to examine the specific ways in which social support promotes adaptation.

While several types of social support have been outlined (e.g., structural, functional, emotional, instrumental; Helgeson & Lopez, 2010), recent attention has focused on the differing contributions of perceived and received support. Perceived support is defined as the self-reported perception of available support within the social network. Received support is defined as the provision of concrete, measurable supportive behaviors by members of the social network (Haber, Cohen, Lucas, & Baltes, 2007). The findings regarding the differing associations of perceived and received support with adjustment have been mixed. While some findings indicate that perceived support relates more strongly to adjustment than received support (Norris & Kaniasty, 1996), other findings have shown a stronger relationship for received support than for perceived support (Helgeson & Lopez, 2010).

Given these findings, one avenue for research has concerned the study of how the perception of support differs from the receipt of support in relation to adjustment. While the perception of support from others may confer positive adaptation, the extent to which support is actually received may also be central to the process of adjustment following trauma. More broadly, another avenue for research has investigated the nature of the relationship between support and adjustment itself. While many studies have uncovered

a positive relationship between social support and posttraumatic adjustment (Norris & Kaniasty, 1996; Helgeson & Lopez, 2010), other studies have shown either no relationship or evidence of a negative relationship (Ullman, 1999). These divergent findings may be the result of differing definitions and assessment measures of social support used across studies. The divergent findings may also stem from studies which have unknowingly assessed both positive and negative social responses to the disclosure of trauma (Ullman, 1999). Even warm, connected social relationships often evidence periods of discontinuity or strife, which may be heightened or exacerbated upon the disclosure of a traumatic event (Rutter, 1987). Divergent findings may also be the result of moderating variables. Therefore, a third avenue for future research is to uncover the influence of potential moderating factors on the relationship between social support and posttraumatic adjustment. Several authors have found that social, cultural, and environmental factors moderate the relationship between social support and adjustment. Notably, members of cultural minority communities, individuals residing in lower socioeconomic strata, and other disadvantaged groups may be less likely to perceive and receive systemic support than members of cultural majority communities (Norris & Kaniasty, 1996). Given these divergent findings, as well as the possible variability among definitions, measurement efforts, and groups of trauma survivors, further research is needed to clarify the nature of the relationship between social support and posttraumatic resilient adaptation.

Self-efficacy. The construct of self-efficacy has been studied across many diverse fields of inquiry. It has been broadly defined as a sense of competence and capability in

effectively negotiating a variety of life challenges (Bandura, 1977). Within the context of stressful or traumatic life events, self-efficacy is often discussed with regard to coping processes.

Coping self-efficacy has been defined as "the perceived capability to manage one's personal functioning and the myriad environmental demands of the aftermath occasioned by a traumatic event" (Benight & Bandura, 2004, p. 1130). Implicit within this definition is a sense of personal agency, which implies a belief in an individual's ability to shape intended outcomes through direct actions. This agentic model of adaptation posits that individuals' appraisals, coping efforts, and efficacy beliefs are positive to begin with, and are enhanced rather than buffered by resilience factors in the process of adaptation to environmental challenges (Benight & Bandura, 2004). Reviews of the research have demonstrated strong positive correlations, both cross-sectionally and over time, between coping self-efficacy and socioemotional adjustment following trauma (Benight & Bandura, 2004).

Given these findings, other researchers have argued that self-efficacy beliefs might generalize to a variety of life situations. General self-efficacy has been defined as "a broad and stable sense of personal competence to deal effectively with a variety of stressful situations" (Scholz, Gutiérrez-Doña, Sud, & Schwarzer, 2002, p. 243). Studies of general self-efficacy indicate that it relates strongly and negatively to measures of depression and anxiety, and positively to measures of optimism and social support across international samples spanning twenty-five countries (Scholz, Gutiérrez-Doña, Sud, & Schwarzer, 2002). Further, general self-efficacy was strongly and negatively related to

symptoms of PTSD in a meta-analysis of this relationship among adult survivors of collective, but not individual, trauma (Luszczynska, Benight, & Cieslak, 2009). This meta-analysis, however, included a very small number of studies in each effect size calculation ($k < 8$), and so these results are interpreted with caution.

While these findings are compelling, several questions remain within the literature regarding the relationships among self-efficacy and adjustment following trauma. One fertile area for research involves comparing the contributions of coping self-efficacy and general self-efficacy. The construct of coping self-efficacy is embedded within a theoretical framework which has sparked a great deal of interdisciplinary study. Similarly, the construct of general self-efficacy has undergone a number of international validation studies. At the same time, general self-efficacy has been critiqued for showing conceptual and empirical overlap with constructs such as self-esteem, neuroticism, and locus of control (Judge, Erez, Bono, & Thoresen, 2002). A comparison between coping and general self-efficacy as they relate to adjustment would contribute to theoretical and empirical efforts to distinguish and disentangle these constructs. A second area for research involves gaining further evidence of cross-cultural validity for the self-efficacy construct. While some researchers have noted that the sense of personal agency inherent in the construct may be more relevant for members of individualistic cultures (Hobfoll, Schröder, Wells, & Malek, 2002), others have found empirical evidence that self-efficacy beliefs operate across several diverse individualistic and collectivistic cultural systems (Luszczynska, Gutiérrez-Doña, & Schwarzer, 2005). Given the theoretical and empirical distinctions between coping and general self-efficacy, as well as the question of cross-

cultural validity of these constructs as they relate to adjustment, further research is needed to clarify the nature of the relationship between self-efficacy and posttraumatic resilient adaptation.

Self-esteem. The construct of self-esteem has also been widely researched. In this research, it has been defined as the sense of value that individuals ascribe to themselves (Baumeister, Campbell, Krueger, & Vohs, 2003). Self-esteem tends to be evaluative in nature (Zeigler-Hill, 2011), with these self evaluations enduring over time as personal traits (Sokol, 2010). High trait self-esteem tends to be characterized by positive self-perceptions as well as efforts to promote or enhance feelings of self-worth. Conversely, low trait self-esteem is characterized by negative self-perceptions accompanied by efforts to protect what little self-worth exists (Ziegler-Hill, 2011). Over time, levels of self-esteem may be either stable and enduring, or fragile and in need of consistent maintenance (Zeigler-Hill, 2011). Empirically, self-esteem has been positively correlated with confidence, sociability, and performance measures, and negatively correlated with measures of depression, anxiety, and other psychological disorders (Baumeister et al., 2003; Ziegler-Hill, 2011). Given these findings, high self-esteem appears to be beneficial while low self-esteem appears to be detrimental. As a result, individuals often seek to enhance self-esteem and reduce negative self-perceptions (Crocker & Park, 2004). This pursuit of self-esteem, however, comes with several costs. Individuals who attempt to bolster their self-esteem may struggle with adapting after traumatic events, which may threaten their sense of personal value and worth (Crocker & Park, 2004). In addition, individuals who pursue self-esteem tend to report difficulty

with interpersonal relationships and self-regulation of emotional and behavioral responses in times of stress (Crocker & Park, 2004).

The relationship between self-esteem and adjustment to trauma, then, remains an important area for future research. One area for future inquiry concerns the nature of this relationship. Since self-esteem has reliably shown positive correlations with adjustment indicators such as well-being, it may relate positively to resilient adaptation following trauma. However, since self-esteem has also shown several potential costs to personal and social functioning, it may instead relate negatively to resilient adaptation following trauma. Another area for future inquiry concerns the identification of factors which may impact the relationship between self-esteem and adjustment. For example, researchers have noted that mean scores on measures of self-esteem tend to be higher among members of individualistic cultures than among members of collectivistic cultures. Therefore, the costs and benefits of self-esteem may be more salient for cultural groups which place emphasis on personal success than for cultural groups which place emphasis on working toward collective goals (Crocker & Park, 2004). Given the theoretical and empirical distinctions between the possible benefits and costs of self-esteem, as well as the question of cross-cultural validity of this construct as it relates to adjustment, further research is needed to clarify the nature of the relationship between self-esteem and posttraumatic resilient adaptation.

Spirituality. Emerging recently in the literature concerning adjustment to adversity, the constructs of religion and spirituality have been the subjects of considerable debate. Religion has been broadly defined as "a search for significance in

ways related to the sacred" (Pargament, 1997, p. 32). Within this definition, the search for significance is comprised of both meaningful goals and the pathways by which individuals pursue these goals (Pargament, 2002). Within this search, spirituality represents a subjective, personal belief system that informs religiously oriented behaviors (McIntosh, Poulin, Silver, & Holman, 2011). Spirituality, then, is the personal search for significance informed by the sacred.

As such, spirituality and religion serve several potentially important functions following trauma. They provide a potential framework for making meaning of life events, and they often convey a sense of comfort, anxiety reduction, interpersonal connectedness, and closeness with the divine (Pargament & Cummings, 2010). At the same time, religious practices have been critiqued as negative influences on mental health, particularly when these practices involve more dogmatic ways of thinking (Pargament, 2002). Specifically, spiritual struggles, or efforts to understand spiritual tenets in the wake of external events which bring religious belief structures into question, may arise following a traumatic life event and lead to difficulties adjusting (Pargament & Cummings, 2010).

Given these findings concerning spiritual benefits and spiritual struggles, the nature of the relationship between spirituality and adjustment in the aftermath of trauma remains a fertile area for ongoing research. In a review of research concerning religion and PTSD, Chen & Koenig (2006) found a fairly even split between studies that uncovered a positive association between religion and PTSD and studies that uncovered a negative association between these constructs. These divergent findings may be the

result of the benefits and struggles of spiritual practice described above. Empirical differences may also be accounted for by measurement difficulties (Chen & Koenig, 2006; Pargament, 2002; Pargament & Cummings, 2010). Specifically, measures of longstanding dispositional spirituality may differ from measures of situational spiritual responses as they relate to adjustment (Pargament, 2002). In addition, the nature of the relationship between spirituality and adjustment may also depend on sociocultural differences. Some marginalized groups have been more likely to report benefit from spiritual practices than cultural majority groups (Pargament & Cummings, 2010). Religious systems often provide explanations for systemic inequities and suggest ways of coping with difficult circumstances (Pargament, 2002). Given the positive and negative aspects of religion and spirituality, as well as the possibility that these constructs may vary depending on dispositional factors, situational responses, and sociocultural variables, further research is needed to clarify the nature of the relationship between spirituality and posttraumatic resilient adaptation.

Optimism. Over the course of the past three decades, optimism has emerged as a theoretically embedded, empirically informed construct concerning individuals' outlooks on the world. Optimism has been defined as a cognitive process of expecting positive outcomes from participation in a variety of situations (Scheier & Carver, 1985). Subsequent theorists have added that in addition to informing future expectancies, optimism may also appear as a positive explanatory style for past events (Buchanan & Seligman, 1995; as cited in Peterson, 2000). Therefore, optimism consists of not only

positive expectancies about the future, but also positive characterizations of the past which tend to be stable over time.

In recent reviews of the research, optimism has been reliably related to aspects of positive mood and motivation to overcome life stressors (Peterson, 2000). In spite of these findings, optimism has also been critiqued as a construct that merely represents a positive illusion (Peterson, 2000). Researchers have argued that a construct conceptualized as illusory in nature could not relate to positive adjustment on a consistent basis, particularly following traumatic events which might shatter the illusion of positive future prospects in life. Supporters of this view argued that more realistic appraisals of both positive and negative outcomes would relate more strongly to adjustment than optimism (Peterson, 2000). However, subsequent research began to show that optimistic thinking is widespread, variable among individuals, and related to adaptive functioning in spite of its occasionally illusory nature. Reviews of the optimism research also indicated that optimism is reliably related to several positive outcomes including well-being, positive emotions, perseverance in response to stress, achievement, and physical health (Peterson, 2000).

Given these reliable relationships between optimism and positive functioning, research attention has turned to optimism in the context of trauma. Many studies have hypothesized that optimistic individuals will likely respond to trauma by engaging in active coping, reporting positive expectancies, and demonstrating ongoing positive affect (Bostock, Sheikh, & Barton, 2009). Results from studies investigating optimism in response to traumatic stress, however, have shown mixed findings. In a meta-analysis of

studies relating optimism to posttraumatic growth, some studies yielded significant positive effect sizes, other studies yielded significant negative effect sizes, and additional studies showed evidence of null effect sizes (Bostock, Sheikh, & Barton, 2009). This analysis was based on a relatively small number of studies ($k=12$) which investigated optimism and growth in the context of chronic health diagnoses, which may differ from other traumatic events in the perceived possibility of recovery. In addition, this analysis, like many current studies, did not account for possible cultural, social, or age related differences in optimism. Researchers have observed that the construct of optimism was created and studied nearly exclusively in Western, individualistic cultures. Positive expectancies about one's personal future may not relate to well-being or adjustment in the same way for members of collectivistic cultures as for members of individualistic cultures (Peterson, 2000). Similarly, positive expectancies for future events may not occur as commonly or relate as reliably to positive outcomes among members of marginalized groups in spite of optimistic beliefs (Peterson, 2000). Given the theoretical and empirical distinctions between the possible positive and negative relationships among optimism and posttraumatic adjustment, as well as the question of cross-cultural validity of the optimism construct as it relates to adjustment, further research is needed to clarify the nature of the relationship between optimism and posttraumatic resilient adaptation.

Rationale for Meta-Analysis

The current body of literature on resilient functioning among adult trauma survivors has identified and explored numerous variables which promote adaptive functioning in the face of adversity. Among populations of adult trauma survivors,

research has historically focused on identifying and understanding risk factors for maladjustment. More recent efforts to illuminate resilient processes have focused research attention on the resilience factors of social support, self-efficacy, self-esteem, spirituality, and optimism as they relate to adjustment and posttraumatic growth. The resulting body of research shows evidence of marked variability in findings. Identified resilience factors have been both positively and negatively related to adjustment indices. Further, these relationships tend to vary based on conceptualization, measurement, type of traumatic event, and individual and cultural differences. This variability may be indicative of the multitude of possible human responses to trauma and adversity (Rutter, 2012). It may also be indicative of the different influence of each resilience factor on the process of resilient adaptation. Specifically, contextual resilience factors such as social support may exert a different influence on resilient adaptation than individual resilience factors such as self-efficacy. Moreover, some of this variability may result from the influences of culture, age, measurement, time, or even type of stressful event on adjustment outcomes. A systematic organization of this literature with attention to possible moderating factors is needed.

Accordingly, several meta-analyses have investigated relationships between one resilience factor and one adjustment outcome. Unfortunately, many of these meta-analyses describe methodological challenges. Some are predicated on the findings from a very small number of studies, leading to possible restriction of range and difficulty in interpreting the findings (e.g., $k < 8$ for all effect sizes in a meta-analysis of the relationship between general self-efficacy and adjustment; Luszczynska, Benight, &

Cieslak, 2009). Others contain a specific focus on a certain type of traumatic event while excluding other conceptually similar types of trauma, again resulting in a small number of studies and difficulty interpreting findings (e.g., focusing only on chronic health conditions, which the authors further reported were not perceived as traumatic for many participants; Bostock, Sheikh, & Barton, 2009). Additional meta-analyses grouped correlations between a resilience factor and several conceptually different outcomes into a single mean effect size calculation, resulting in difficulty interpreting findings and significant heterogeneity among contributing effect sizes (e.g., grouping effect sizes between spirituality and outcomes including self-esteem, acceptance, optimism, and well-being to indicate broader adjustment; Ano & Vasconcelles, 2005). Still others reported significant heterogeneity among effect sizes but did not analyze for potential moderators which may account for this variance (e.g., significant heterogeneity in effect sizes between optimism and negative psychological outcomes; Andersson, 1996). In addition to methodological challenges, these meta-analyses examined each effect size in isolation. While informative, further comparison among the effect sizes was beyond the scope of these existing studies. Such comparisons among effect sizes have great potential to empirically inform an Ecological Systems Theory of resilient adaptation by illustrating the complex interrelationships between resilience factors and adjustment outcomes at individual and social systemic levels.

What is needed, then, is a methodologically rigorous, theoretically informed, conceptually clear, systematic organization of the literature concerning the relationships among resilience factors and adaptive outcomes. Specifically, a meta-analysis of

resilience factors including social support, self-efficacy, self-esteem, spirituality, and optimism as they relate to adaptive outcomes including adjustment to trauma, psychological adjustment, and posttraumatic growth among adults following the experience of trauma would bring clarity to this broad body of resilience research. In the present study, this meta-analysis is conducted. Social support, self-efficacy, self-esteem, spirituality, and optimism are defined and operationalized as described above.

Adjustment to trauma is defined as the absence of posttraumatic stress symptoms.

Psychological adjustment is conceptualized as the absence of general symptoms of maladjustment such as depressed mood, worry, and global distress. Posttraumatic growth is defined as the experience of positive meaning and personal improvement following trauma. In the course of the study, four main research questions are posed. Each research question generates relevant hypotheses for exploration.

Research Questions and Hypotheses

The first research question asks what the meta-analytic relationships are between resilience factors and adjustment to trauma (i.e., absence of posttraumatic stress symptoms) among adult trauma survivors. More specifically, how do social support, self-efficacy, self-esteem, spirituality, and optimism relate to trauma adjustment? In response to this question, the first research hypothesis states that each of these resilience factors will evidence positive meta-analytic relationships with trauma adjustment. The second research hypothesis adds that any effect sizes showing significant heterogeneity of variance will be moderated by demographic, setting, and trauma variables.

The second research question asks what the meta-analytic relationships are between identified resilience factors and psychological adjustment (i.e., absence of general symptoms of maladjustment such as depressed mood, worry, and global distress) among adult trauma survivors. The third research hypothesis posits that each of the resilience factors will evidence positive meta-analytic relationships with psychological adjustment. The fourth research hypothesis adds that any effect sizes showing significant heterogeneity of variance will be moderated by demographic, setting, and trauma variables.

The third research question asks what the meta-analytic relationships are between resilience factors and posttraumatic growth (i.e., experience of positive meaning and growth) among adult trauma survivors. The fifth research hypothesis asserts that each of these resilience factors will evidence positive meta-analytic relationships with posttraumatic growth. The sixth research hypothesis adds that any effect sizes showing significant heterogeneity of variance will be moderated by demographic, setting, and trauma variables.

The fourth research question asks whether or not there are methodological variables which account for additional variance in each of the meta-analytic relationships described above. More specifically, do study design, date of publication, instrumentation, and measurement of resilience factors and outcome variables act as moderators of the relationships among resilience factors and adjustment outcomes? The seventh research hypothesis states that significantly heterogeneous effect sizes will be moderated by methodological variables. Further theoretical and empirical review of the possible

relationships among each resilience factor and each adjustment outcome within the process of resilient adaptation is presented in the second chapter.

CHAPTER TWO

REVIEW OF THE LITERATURE

The finding that individuals facing adverse circumstances often show positive adjustment has become the focus of a broad body of resilience literature (Arbona & Coleman, 2008). Within this literature, the construct of resilience has evolved over time, with initial conceptualizations presenting it as a personality feature (Block & Block, 1980) or an individual trait (Skodol, 2010). More recent definitions have conceptualized resilience as a dynamic developmental process of adaptation in the face of adverse circumstances involving use of a flexible combination of internal competencies and contextual supports to aid in adjustment (Rutter, 2012). The construct of resilient adaptation has grown from a broad body of research on risk for maladjustment. It has spanned four waves of research which yielded a diverse set of findings. It has been critiqued, and from these critiques, it has grown methodologically stronger. In this chapter, findings from the literature on resilient adaptation are reviewed. Critiques of this literature are presented. The need for a systematic review and organization of the findings is reiterated.

Risk as a Precursor to Resilience

Early studies of adjustment were predicated on the hypotheses that certain risk factors would reliably lead to pathology, and that an understanding of pathology would

inform theories of normative human development (Cicchetti, 1984). Several of the classic studies of risk for pathology identified populations that were traditionally considered to be at risk for maladjustment and followed them over time. A review of this research indicates that there are some continuities over time between early adversity and later maladjustment (Rutter, Kim-Cohen, & Maughan, 2006). Specifically, research has shown that the experience of adverse or traumatic life events predicts anxiety and depression in youth, which in turn predicts anxiety and depression in adults (Rutter, Kim-Cohen, & Maughan, 2006; Nemeroff et al., 2006). Similarly, adults who experience a variety of traumatic events often report difficulties with adjustment, though the nature and extent of these difficulties tend to vary depending on the type and severity of the traumatic event and the measurement of maladjustment (Schnurr, Friedman, & Bernardy, 2002). With the development of the diagnosis of posttraumatic stress disorder (PTSD) in the 1980s, several epidemiological studies have investigated rates of this disorder in different populations of adult trauma survivors. Estimates of lifetime PTSD rates among adults range from approximately 7-9% in nationally representative samples (Kessler et al., 1995; Roberts et al., 2011) to approximately 30% in samples of survivors of sexual assault (Resick et al., 2008), with estimates rarely exceeding 30% of trauma survivors (Bonanno et al., 2010). Estimates of lifetime PTSD prevalence tend to range from 10-20% in populations of adults who have experienced combat (Magruder & Yeager, 2009), torture, mass conflict (Johnson & Thompson, 2008), motor vehicle accidents (Resick et al., 2008), and physical assault (Kilpatrick & Acerno, 2003). Additional diagnoses, including depression and substance use disorders, frequently occur as comorbidities with

PTSD following trauma and may complicate the diagnostic picture (Breslau, 2002). Findings from the National Comorbidity Survey (Kessler et al., 1995) indicate that approximately 88% of men and 79% of women with a lifetime diagnosis of PTSD reported symptoms meeting criteria for at least one comorbid condition (e.g., major depressive disorder; Schnurr, Friedman, & Bernardy, 2002; Breslau, 2002). Since commonly used measurement strategies often inflate the estimate of PTSD, some researchers have argued that the prevalence rates are likely to be lower than originally reported (Nemeroff et al., 2006), indicating that a majority of trauma survivors go on to report positive adjustment over time.

In order to more clearly understand and predict maladjustment following trauma, researchers have identified and studied a variety of risk factors. Within the adult literature, the research concerning risk factors was summarized in two influential meta-analyses. Within these meta-analyses, risk factors included demographic variables (e.g., female gender, minority racial and ethnic background), peritraumatic variables (e.g., trauma severity, peritraumatic dissociation), and contextual variables (e.g., trauma history prior to the traumatic event, life stress subsequent to the traumatic event, lack of social support; Brewin, Andrews, & Valentine, 2000; Ozer, Best, Lipsey, & Weiss, 2003). Results from both meta-analyses revealed several important findings. First, the predictive relationships between risk factors and maladjustment were stronger among women, younger adults, and cultural minority group members than among men, older adults, and cultural majority group members. Therefore, intrapersonal and demographic variables appeared to moderate the relationship between risk and maladjustment. Second,

peritraumatic risk factors such as the perceived severity of the traumatic event and contextual risk factors such as lack of social support related strongly to posttraumatic distress. In fact, these social and environmental risk factors tended to relate more strongly to distress than demographic and intrapersonal risk factors. Together, these findings indicated that personal, contextual, and environmental factors influence adjustment processes following trauma. Based on these findings and previous research reviews, theories regarding the development and maintenance of posttraumatic maladjustment were created and refined. Within these theories, the phenomenon of resilient adaptation was identified.

Theories of Maladjustment Following Trauma

Theories of maladjustment following trauma have arisen from several perspectives. Of these, the theories that have received the most research attention include those that arose from cognitive-behavioral and ecological systems perspectives. Cognitive-behavioral theories of posttraumatic maladjustment posit that PTSD symptoms persist following maladaptive appraisals of traumatic events (Ehlers & Clark, 2000; Resick et al., 2008). Appraisals involving excessive threat and danger as well as perceptions of personal inability to cope tend to predict persistent cognitive patterns of negative thoughts about oneself, the world, and the ability to heal. Negative emotions (e.g., fear, anxiety) and negative coping efforts (e.g., avoidance, isolation) tend to maintain negative thinking patterns (Ehlers & Clark, 2000). Further, memories of the traumatic event tend to be fragmented and poorly integrated with the socioenvironmental context in which the event occurred. Treatment protocols have been developed and

studied based on cognitive-behavioral theories of posttraumatic stress. Of these, two have received empirical support following a series of randomized controlled trials (Resick et al., 2008). Cognitive Processing Therapy (Resick & Schnicke, 1993) seeks to identify and modify negative thinking patterns in order to enhance positive emotions and adaptive coping behaviors. Prolonged Exposure therapy (Foa & Rothbaum, 1998) seeks to modify fear, anxiety, and avoidant behavior by revisiting the trauma memory, processing emotions, and re-engaging in life tasks. Implicit to cognitive-behavioral theories and treatments is the idea that not all trauma survivors experience marked posttraumatic stress symptoms. Those who are able to appraise the traumatic situation effectively, make meaning of the traumatic event, experience related emotions, and adaptively cope with life stressors tend to function well. However, within cognitive-behavioral theories, the appraisals, cognitions, emotions, and coping efforts that enhance positive adjustment tend to be individual in nature. While both therapies seek to place memories of trauma within the context in which they occurred, the onus of changing patterns of thinking and behavior remains on the individual.

Ecological systems theories add to this conceptualization of adaptive posttraumatic coping by considering social, contextual, and environmental influences on adjustment (Waller, 2001). Individual factors such as cognitive style, emotion regulation, coping self-efficacy, optimism, and self-esteem are recognized as positive correlates of adjustment. In addition, the theory postulates that social support, cohesion, and positive modeling of stress management strategies likely relate to resilient functioning (Waller, 2001). Further, community factors such as stability, sense of belonging, shared resources,

and effective communication among institutions may enhance resilient adaptation. Broader cultural and environmental factors such as positive cultural identity, activism, and justice may also provide a context where resilient functioning can take place (Waller, 2001). Interactions among resilience factors across systems likely enhance adaptation in the context of adversity (Luthar et al., 2000). Unfortunately, interventions informed by ecological systems theory have not been widely developed or evaluated among adult populations. Authors have noted that bringing systemic resilience factors into empirically supported cognitive behavioral treatments (e.g., enhancing social support) may confer benefit to adult survivors of trauma (Waller, 2001).

In sum, the process of resilient adaptation following adversity has been studied intently over the course of the past five decades. Initial epidemiological and empirical findings have shown that a majority of individuals facing adversity tend to adjust and function adaptively. In an effort to conceptualize and understand the phenomena of risk, pathology, resilience, and adaptation following trauma, a multitude of theories have been developed and evaluated. Ecological systems theory, which tends to account for a variety of interacting risk and resilience factors in relation to maladjustment and adjustment outcomes, has been widely used as a framework for understanding the broad body of empirical findings which have emerged in the course of the past five decades. In this time span, there have been four waves of resilience research. Findings across these four waves have illuminated the antecedents, main effects, moderating processes, and outcomes of resilient adaptation across diverse populations of youth and adults. Since research among at-risk youth provided an initial set of findings which informed the

development of resilience theories and interventions, these findings are briefly reviewed with more thorough attention given to the research among adult populations. A closer look at the unfolding findings of this research shows several themes and highlights areas in need of future organization, theoretical consideration, and empirical investigation.

First Wave of Resilience Research: Correlates of Resilient Functioning

Studies comprising the first wave of resilience research began by identifying and studying resilience factors which relate directly to positive adjustment outcomes. Within this body of research, studies focused on uncovering the correlates of positive adjustment among at-risk youth and adults (Masten, 2011; Bonanno et al., 2010).

In the youth resilience literature, resilience factors were defined as variables which related positively and directly to adjustment outcomes. Researchers hypothesized that resilience factors operated within a compensatory model (Masten, 2001). Within this model, resilience factors correlated positively to adjustment outcomes in the presence of risk. Given the linear nature of these hypothesized relationships, any increase in the number and quality of resilience factors above and beyond the number of risk factors was expected to facilitate positive adjustment (Garmezy, Masten, & Tellegen, 1984; Masten, 2001). In initial studies, an overarching goal was to determine which naturally occurring factors most effectively differentiated individuals who were functioning adaptively from individuals who were displaying indicators of maladjustment (Masten, 2001). In one influential study, Werner & Smith (1992) followed a cohort of children born on the island of Kauai, many of whom experienced a variety of contextual risk factors including socioeconomic disadvantage and lack of access to resources. While some of the children

struggled academically and behaviorally, the majority of the cohort went on to thrive as adolescents by achieving academic success and social competence in the form of meaningful peer relationships (Werner & Smith, 1992). In another influential study, Rutter and colleagues (1970, as cited in Rutter, 1985) studied children from the rural Isle of Wight and children from urban London neighborhoods. Initial findings revealed higher rates of psychopathology (e.g., behavioral problems, psychological symptoms) among the children from London than among the children from the Isle of Wight. Upon closer examination, however, this difference was almost fully explained by social factors. Positive relationships with family members were found to promote positive functioning among all children, while a lack of support was found to predict maladjustment in the sample. Regardless of the context of risk, then, social support facilitated adaptation. In an additional study, Rutter and colleagues (1998) studied a group of children who were adopted from deprived institutional settings. While length of deprivation predicted functional difficulties (e.g., difficulty with attachment), a majority of the children who moved into supportive households made remarkable gains in health and functioning. Many ended up functioning at the same level as children in the community (Rutter et al., 2007). Therefore, even in a context of severe deprivation and adversity, support from family and community members predicted adjustment. Researchers began to wonder whether or not children would be able to adapt to stress without a supportive family environment. In a parallel study, Garmezy (1981, as cited in Garmezy, Masten, & Tellegen, 1984) investigated the behavioral patterns, social functioning, and attentional capacity of at-risk children of parents with schizophrenia who struggled to attend to their

children. Over time, the majority of the children evidenced adaptive patterns of social interactions, academic performance, and work achievement, with only a small group of children going on to develop psychopathology (Garmezy, Masten, & Tellegen, 1984). Follow up studies indicated that resilient functioning in childhood was a strong predictor of resilient functioning as measured by developmentally and culturally appropriate outcomes in adolescence (Masten et al., 1999) and early adulthood (Masten et al., 2004).

Findings from these initial studies among youth led to several insights concerning the nature of the construct of resilience (Luthar, 2006). First, the findings from these studies indicated that resilience factors were most effectively conceptualized systemically (Masten & Coatsworth, 1998). Individual attributes (e.g., social competence), family characteristics (e.g., parental support), and environmental contexts (e.g., community programming) related meaningfully to each other and to the process of adaptation in the face of adversity (Luthar, Cicchetti, & Becker, 2000). Second, findings indicated that within longitudinal samples, resilient functioning tended to fluctuate over time. With new adversities came new challenges in resilient adaptation (Luthar, 2006). While resilient functioning at one time tended to predict resilient functioning at a later time (Egeland, 2007), this was not guaranteed (Masten et al., 2004). Further, findings began to show that resilient functioning in one domain (e.g., academic performance) did not predict resilient functioning in other domains (e.g., social competence). Finally, resilient functioning did not always predict well-being and psychological adjustment. Some individuals who functioned resiliently also reported internal distress, possibly as a result of seeing the toll of risk factors within their communities (Luthar, 1991, 2006). In

response to these findings, researchers began to focus more precisely on describing and understanding the nature of the relationships among risk factors, resilience factors, and adaptive functioning in context. Among populations of at-risk youth, positive relationships with caring adults and the ability to self-regulate attention, emotions, and behavior emerged as reliable predictors of adaptive functioning (Masten & Coatsworth, 1998, Luthar, 2006). Children with secure attachments to parents and prosocial adults reported more stable and rewarding peer relationships, fewer psychological symptoms, stronger academic functioning, and more prosocial behavior than children without supportive relationships (Egeland, 2007; Eisenberg et al., 1997). Positive peer relationships and self-regulation skills were related to factors including self-esteem, mental health, self-efficacy, and positive beliefs about school among adolescents who experienced adversity (Luthar, 2006; Masten & Coatsworth, 1998). Therefore, a number of both individual and social resilience factors predicted positive adjustment to adversity among populations of at-risk youth. Together, these findings concerning individual and social resilience factors laid the foundation for research into resilient functioning in adulthood (Masten et al., 2004).

Among populations of at-risk adults, resilience research has focused primarily on adaptation in the context of potentially traumatic events, including disasters (Bonanno, Brewin, Kaniasty, & LaGreca, 2010), crime victimization (Dutton & Greene, 2010; Kilpatrick & Acerno, 2003), violent trauma (Connor, Davidson, & Lee, 2003), combat (Vogt & Tanner, 2007; Magruder & Yeager, 2009), sexual assault (Lam & Grossman, 1997), and exposure to mass conflict and displacement (Steel et al., 2009; Johnson &

Thompson, 2007). While initial studies of adult trauma survivors focused primarily on identifying and conceptualizing risk factors for psychopathology, more recent studies began investigating the correlates of posttraumatic resilient functioning among adults. Within these studies, several correlates of positive adaptation have emerged. Among adult populations, the resilience factors which have benefitted from the most research attention are social support, self-efficacy, self-esteem, spirituality, and optimism. These resilience factors have been related to a variety of adjustment indices. Within the literature, adjustment is often conceptualized along a continuum ranging from maladjustment to positive growth. Maladjustment may be specific to a particular event, as in the case of PTSD following an identified trauma. Within the present study, adjustment to trauma is defined as an absence of posttraumatic stress symptoms that impede daily functioning. Maladjustment may also be more generalized, as in the case of depression or global distress. In this study, more general psychological adjustment is defined as an absence of depressive or global distress symptoms. Recently, studies have identified a phenomenon of not just adjusting, but also growing following adversity. Posttraumatic growth is defined as the experience of positive benefit and personal improvement following a traumatic event (Tedeschi & Calhoun, 1996). Resilience factors including social support, self-efficacy, self-esteem, spirituality, and optimism have evidenced some variability in relation to adjustment to trauma, psychological adjustment, and posttraumatic growth. A closer exploration of these relationships reveals both continuity and discontinuity in findings across studies.

Social Support

Social support has been defined as a multifaceted phenomenon involving warm, positive interactions with members of a social network who seek to provide assistance across a variety of life situations (Helgeson & Lopez, 2010). Within the context of stressful or traumatic life events, social support research has largely focused on the ability of supportive social networks to promote positive adaptation in times of stress.

Research reviews concerning the relationship between social support and adjustment to trauma have uncovered correlations between these constructs (Helgeson & Lopez, 2010). These correlations tend to be strong, positive, and statistically significant, indicating that social support relates meaningfully to a lack of PTSD symptoms. These findings have emerged in studies of individuals who survived combat trauma (Taft, Stern, King, & King; Tiet et al., 2006), air attacks (Adams & Boscarino, 2011), bombings (Benight et al., 2000) motor vehicle accidents (Dougall, Ursano, Posluszny, Fullerton, & Baum, 2001), physical assaults (Harrison & Kimer, 1998), traumatic injuries (Nielsen, 2003), and sexual assaults (Babcock, Roseman, Green, & Ross, 2008; Bradley, Schwartz, & Kaslow, 2005). However, some studies have shown negative relationships between social support and lack of PTSD symptoms (Andrews, Brewin, & Rose, 2003; Cieskak et al., 2009; Ullman et al., 2007). Studies reporting these negative relationships were conducted following particularly severe traumatic events including sexual assault, devastating hurricane, and violent physical assault. Further, these studies were conducted among marginalized populations reporting low or no income and a notable lack of

available resources. The social support provided to these individuals may not have been enough to help them heal in the midst of a chaotic posttraumatic environment.

Studies investigating the relationship between social support and psychological adjustment have also found correlations between these constructs. Across these studies, social support related positively and significantly to an absence of both general distress and depressive symptoms. These findings have emerged in studies of hurricane survivors (Lowe, Chan, & Rhodes, 2010; Zwiebach, Rhodes, & Roemer, 2010), women who survived mass conflict during the Intifada (Khamis, 1998), individuals surviving traumatic injuries (Sherman, DeVinney, & Sperling, 2004; Rintala et al., 1992), intimate partner violence survivors (Mitchell et al., 2006), and individuals seeking treatment at community clinics following a variety of traumatic events (Kwako, Szanton, Saligan, & Gill, 2011; Rode, 2011). In addition, social support has correlated positively with posttraumatic growth. This finding has emerged in populations of former war prisoners (Erbes et al., 2005; Feder et al., 2008) and hurricane and earthquake survivors (Borja & Callahan, 2008; Karanci & Acarturk, 2005).

Together, these findings indicate that social support and adjustment to trauma tend to be positively correlated. Similarly, social support and general psychological adjustment have shown positive correlations. In addition, social support and posttraumatic growth tend to be positively correlated. Effect sizes for these relationships tend to vary, and several factors may account for this variability. One factor which may account for discrepancies in findings is the type of social support. While several types of social support have been outlined (e.g., structural, functional, emotional, instrumental;

Helgeson & Lopez, 2010), recent attention has focused on the differing contributions of perceived and received support. Perceived support is defined as the self-reported perception of available support within the social network. Received support is defined as the provision of concrete, measurable supportive behaviors by members of the social network (Haber, Cohen, Lucas, & Baltes, 2007). Both perceived support and received support have shown positive correlations with adjustment to trauma and psychological adjustment. However, some authors have argued that perceived support may be a more consistent predictor of adjustment than received support (Haber, Cohen, Lucas, & Baltes, 2007). A second factor which may account for variability in findings is the nature of the traumatic event. Individuals who survive severe trauma may struggle to find social support. The support that they find may not be enough to surmount systemic challenges such as persistent lack of resources (Norris & Kaniasty, 1996; Hobfoll, 2001). A third factor which may explain some of the discrepancy in findings is time. Kaniasty and Norris (2008) posit that social support may initially predict positive adjustment following trauma. Over time, individuals who struggle or develop symptoms of PTSD (e.g., irritability, distancing from others) may experience a decline in the social support resources available to them. Longitudinal studies have confirmed that while social support may initially prove beneficial for adjustment, PTSD symptoms tend to erode the support system over time (King et al., 2006). Given the divergent findings concerning the relationships between social support and adjustment outcomes, further research is needed to clarify the nature of these relationships and moderating variables.

Self-Efficacy

Self-efficacy has been defined as a sense of competence and capability in effectively negotiating a variety of life challenges (Bandura, 1997). Reviews of the research have demonstrated strong positive correlations between self-efficacy and adjustment following trauma (Benight & Bandura, 2004). These correlations tend to be strong, positive, and statistically significant, indicating that self-efficacy relates meaningfully to a lack of PTSD symptoms. This finding has emerged across populations of natural disaster survivors (Benight & Harper, 2002; Sumner et al., 2005; Benight, Ironson, & Druham, 2002; Benight et al., 1999; Cieslak et al., 2009 Hirschel & Schulenberg, 2009), survivors of a city bombing (Benight et al., 2000), civilian survivors of mass conflict (Ben Zur, 2008), motor vehicle accident survivors (Benight, Cieslak, Molton, & Johnson, 2008), individuals who sustained traumatic injuries (Flatten, Walte, & Perlitz, 2008), refugees who witnessed political violence (Hussain & Bhushan, 2011), sexual assault survivors (Regehr, Cadell, & Jansen, 1999; Ullman et al., 2007; Cieslak, Benight, & Lehman, 2008; Walter et al., 2010) and firefighters who experienced trauma in the line of duty (Regehr, Hill, Knot, & Sault, 2003; Smith et al., 2011). One study reported a null relationship between self-efficacy and PTSD symptoms in a sample of adults who survived mass violence in the context of political upheaval ($r=.00$; Morina & VonCollani, 2006). These authors concluded that the experience of trauma-related symptoms may not impact the cognitive evaluation of one's capacity to respond to stress.

Many studies have also reported strong, positive correlations between self-efficacy and psychological adjustment, indicating that self-efficacy also relates

meaningfully to a lack of both general distress and depressive symptoms following trauma. Self-efficacy has been positively related to psychological adjustment in studies of sexual assault survivors (Hobfoll et al., 2002; Regehr, Cadell, & Jansen, 1999), witnesses of a mass shooting (Littleton et al., 2009), and firefighters (Regehr et al., 2003; Smith et al., 2011).

Very few studies have assessed the relationship between self-efficacy and posttraumatic growth. In one study of hurricane survivors, Cieslak et al. (2009) found a small positive relationship between self-efficacy and posttraumatic growth ($r=.04$). This relationship was moderated by the initial experience of maladjustment. Individuals who endorsed self-efficacy beliefs but had symptoms of PTSD shortly following the hurricane tended to report posttraumatic growth over time, while individuals who endorsed self-efficacy beliefs but did not experience symptoms of PTSD shortly following the hurricane reported ongoing adjustment but not posttraumatic growth. In a study of Tibetan refugee survivors of mass conflict, Hussain and Bhushan (2011) found a small positive relationship between self-efficacy and posttraumatic growth ($r=.07$). The authors noted that in this population, collective growth oriented activities such as re-establishing cultural and religious traditions may relate more strongly to posttraumatic growth than individual self-efficacy beliefs.

Together, these findings indicate that self-efficacy relates positively to both adjustment to trauma and psychological adjustment. The relationship between self-efficacy and posttraumatic growth may depend on cultural values or initial responses to a traumatic event. While these findings are compelling, several questions remain regarding

the relationships between self-efficacy and adjustment following trauma. One fertile area for research involves comparing the contributions of coping self-efficacy and general self-efficacy as they relate to adjustment. Coping self-efficacy has been defined as "the perceived capability to manage one's personal functioning and the myriad environmental demands of the aftermath occasioned by a traumatic event" (Benight & Bandura, 2004, p. 1130). General self-efficacy has been defined as "a broad and stable sense of personal competence to deal effectively with a variety of stressful situations" (Scholz, Gutiérrez-Doña, Sud, & Schwarzer, 2002, p. 243). While coping self-efficacy may relate more strongly to adjustment outcomes than general self-efficacy (Benight & Bandura, 2004), an empirical comparison would contribute to theoretical efforts to distinguish and disentangle these constructs. A second area for research involves gaining further evidence of cross-cultural validity for the self-efficacy construct. While some researchers have noted that the sense of personal agency inherent to the construct may be more relevant for members of individualistic cultures (Hobfoll, Schröder, Wells, & Malek, 2002), others have found empirical evidence that efficacy beliefs operate across several diverse individualistic and collectivistic cultural systems (Luszczynska, Gutiérrez-Doña, & Schwarzer, 2005). Given the theoretical and empirical distinctions between coping and general self-efficacy, as well as the question of cross-cultural validity of these constructs as they relate to adjustment, further research is needed to clarify the nature of the relationship between self-efficacy and posttraumatic resilient adaptation.

Self-Esteem

Self-esteem has been defined as the sense of positive value and worth that individuals ascribe to themselves (Baumeister, Campbell, Krueger, & Vohs, 2003). Self-esteem tends to be evaluative in nature (Zeigler-Hall, 2011), with these self evaluations enduring over time (Sokol, 2010). Reviews of the research have documented a positive relationship between self-esteem and positive adjustment outcomes (Baumeister et al., 2003; Ziegler-Hill, 2011).

Several empirical studies have found positive correlations between self-esteem and adjustment to trauma. These correlations tend to be strong and statistically significant, indicating that self-esteem relates to a lack of PTSD symptoms. This finding has emerged across studies of motor vehicle accident survivors (O'Donnell et al., 2007), college student trauma survivors (Frazier et al., 2011), sexual assault survivors (Walter, Horsey, Palmieri, & Hobfoll, 2010; Bradley, Schwartz, & Kaslow, 2005), witnesses of an air attack (Adams & Boscarino, 2011), and survivors of mass political conflict (Morina & VonCollani, 2006). A small negative correlation was found between self-esteem and lack of PTSD symptoms in a population of flood survivors (Monson et al., 2009). These authors noted that self-esteem may not have protected the sample from maladjustment following this devastating natural disaster.

Additional studies have uncovered correlations between self-esteem and psychological adjustment. These correlations tend to be strong, positive, and statistically significant as well. In their 2010 study of individuals who had sustained a traumatic injury, Smedema, Catalano & Ebener found a large positive correlation between self-

esteem and lack of generalized distress symptoms. Self-esteem was also positively related to psychological adjustment in studies of an earthquake in Turkey (Sumner et al., 2005), individuals dealing with traumatic loss of a loved one (Mancini, Prati, & Black, 2011), motor vehicle accident survivors (Ehring, Ehlers, & Glucksman, 2008), and sexual assault survivors (Frazier, Conlon, & Glaser, 2001). Self-esteem has been positively related to posttraumatic growth in samples of Israeli combat veterans (Dekel, Mandl, & Solomon, 2011), hurricane survivors (Borja & Callahan, 2008), and individuals who lost a loved one in a traumatic accident (Engelkemeyer & Marwit, 2008).

While these findings are informative, several avenues remain for future research concerning the relationships among self-esteem and adjustment following trauma. One area for future inquiry concerns the nature of this relationship. While self-esteem has reliably shown positive correlations with adjustment indicators in some studies, it has also shown negative correlations in other studies. Researchers have explained this discrepancy of findings by noting that while self-esteem can enhance well-being (Baumeister et al., 2003), it may also have several potential costs to personal and social functioning and instead relate negatively to resilient adaptation following trauma (Crocker & Park, 2004). Another area for future inquiry concerns the identification of factors which may impact the relationship between self-esteem and adjustment. For example, researchers have noted that mean scores on measures of self-esteem tend to be higher among members of individualistic cultures than among members of collectivistic cultures. Therefore, the costs and benefits of self-esteem may be more salient for cultural groups which place emphasis on personal success than for cultural groups which place

emphasis on working toward collective goals (Crocker & Park, 2004). Given the theoretical and empirical distinctions between the possible benefits and costs of self-esteem, as well as the question of cross-cultural validity of this construct as it relates to adjustment, further research is needed to clarify the nature of the relationship between self-esteem and posttraumatic resilient adaptation.

Spirituality

Religion has been broadly defined as "a search for significance in ways related to the sacred" (Pargament, 1997, p. 32). Within this definition, the search for significance is comprised of both meaningful goals and the pathways by which individuals pursue these goals (Pargament, 2002). Within this search, spirituality represents a subjective, personal belief system that informs religiously oriented behaviors (McIntosh, Poulin, Silver, & Holman, 2011). Spirituality, then, is the personal search for significance informed by the sacred. As such, spirituality serves several potentially important functions following trauma. It provides a framework for making meaning of life events, and it often conveys a sense of comfort, interpersonal connectedness, well-being, and closeness with the divine (Ashkanani, 2009; Arnette et al., 2007; Kennedy, Davis, & Taylor, 1998; Pargament & Cummings, 2010). At the same time, spiritual struggles, or efforts to understand spiritual tenets in the wake of external events which bring religious belief structures into question, may arise following a traumatic life event and lead to difficulties adjusting (Pargament & Cummings, 2010). Accordingly, reviews of the research have documented both positive and negative correlations between spirituality and adjustment in the aftermath of trauma (Chen & Koenig, 2006).

Several studies have uncovered positive correlations between spirituality and adjustment to trauma. These correlations tend to be statistically significant yet modest in size, indicating that spirituality may relate positively to lack of PTSD symptoms. This finding has emerged across populations including college students reporting trauma (Lee & Waters, 2003) and African American women who survived repeated assaults (Watlington & Murphy, 2006). Other studies have uncovered negative correlations between spirituality and adjustment to trauma. These correlations tend to be small in size, indicating that spirituality may relate positively to PTSD symptoms. This finding has been uncovered in populations of Jewish and Muslim civilians who witnessed mass conflict along the border of Israel and Palestine (Hobfoll, Canetti-Nisim, & Johnson, 2006), North American Christian civilian survivors of various trauma (e.g., natural disaster, assault; Harris et al., 2008) German civilian survivors of bombing (Maercker & Herrle, 2003), and American and Taiwanese college students who reported trauma (Gerber, Boals, & Schuettler, 2011; Heppner et al., 2006). Similarly, several of these studies have reported positive correlations between spirituality and psychological adjustment. These correlations tend to be moderate in size, indicating a positive relationship between spirituality and lack of generalized depressive symptoms (e.g., Hobfoll, Canetti-Nisim, & Johnson, 2006, Palestinian population; Watlington & Murphy, 2006). However, other studies have reported negative correlations between spirituality and psychological adjustment. These correlations tend to be small in size, indicating a slight positive relationship between spirituality and depressive symptoms (e.g., Hobfoll, Canetti-Nisim, & Johnson, 2006, Israeli population; Heppner et al., 2006).

The relationship between spirituality and posttraumatic growth appears to be positive and moderate to large in size across a variety of samples. This finding has emerged in studies of former Vietnam prisoners of war (Feder et al., 2008), assault and threat survivors (Schultz, Tallman, & Altmaier, 2010), clergy who survived trauma (Proffitt et al., 2007), Australian survivors of traumatic injury (Peterson et al., 2008), and college students who reported a history of trauma (Calhoun et al., 2000).

In sum, spirituality has shown evidence of both positive and negative correlations with trauma adjustment and psychological adjustment. A robust positive relationship has emerged between spirituality and posttraumatic growth, and spirituality appears to relate more strongly to posttraumatic growth than to trauma adjustment in studies measuring these relationships (e.g., Harris et al., 2008; Gerber et al., 2011). Given these divided findings, the nature of the relationship between spirituality and adjustment in the aftermath of trauma remains a fertile area for ongoing research. Divergent findings may be the result of the benefits and struggles of spiritual practice. Empirical differences may also be accounted for by measurement difficulties (Chen & Koenig, 2006; Pargament, 2002; Pargament & Cummings, 2010), particularly since some measures of spirituality consist of only one item (e.g., Hobfoll et al., 2006). Similarly, measures of longstanding dispositional spirituality may differ from measures of situational spiritual responses as they relate to adjustment (Pargament, 2002). In particular, measures of dispositional spiritual beliefs have been negatively related to trauma adjustment (e.g., Maercker & Herrle, 2003) while measures of spiritual coping efforts have been positively related to trauma adjustment (e.g., Watlington & Murphy, 2006). In addition, the nature of the

relationship between spirituality and adjustment may also depend on sociocultural differences. Some marginalized groups have been more likely to report benefit from spiritual practices than cultural majority groups (Pargament & Cummings, 2010).

Religious systems often provide explanations for systemic inequities and suggest ways of coping with difficult circumstances (Pargament, 2002). Given the positive and negative aspects of religion and spirituality, as well as the possibility that these constructs may vary depending on dispositional factors, situational responses, and sociocultural variables, further research is needed to clarify the nature of the relationship between spirituality and posttraumatic resilient adaptation.

Optimism

Optimism has been defined as a cognitive process of expecting positive outcomes from participation in a variety of situations (Scheier & Carver, 1985). Subsequent theorists have added that in addition to informing future expectancies, optimism may also appear as a positive explanatory style for past events (Buchanan & Seligman, 1995; as cited in Peterson, 2000). Therefore, optimism consists of not only positive expectancies about the future, but also positive characterizations of the past which tend to be stable over time. In recent reviews of the research, optimism has been reliably related to aspects of positive mood and motivation to overcome life stressors (Peterson, 2000). In addition, several studies have uncovered positive correlations between optimism and adjustment to trauma. These correlations tend to be statistically significant, positive, and moderate in size, indicating that optimism relates to lack of PTSD symptoms. This finding has emerged across populations including Israeli citizens displaced from a

combat zone during mass conflict (Ben Zur, 2008), hurricane survivors (Benight et al., 1999), firefighters who witnessed trauma while on the job (Smith et al., 2011), motor vehicle accident survivors (Zoellner et al., 2008), veterans of the Operation Iraqi Freedom conflict (Thomas et al., 2011), and assault survivors presenting to an emergency department (Denson et al., 2007).

Similarly, several of these studies have reported positive correlations between optimism and psychological adjustment. These correlations tend to be moderate to large in size, indicating a positive relationship between optimism and lack of generalized depressive symptoms. In a study of active duty Army personnel who were deployed to combat zones during Operation Iraqi Freedom, Schauerbroeck et al. (2011) found large positive correlations between optimism and lack of depressive symptoms. In this study, optimism also evidenced large positive correlations with lack of generalized anxiety symptoms and with positive affect. In a population of college students who witnessed a campus shooting, Littleton et al. (2009) also reported large, positive correlations between optimism and lack of depressive symptoms. Optimism tended to relate more strongly to psychological adjustment than to trauma adjustment in studies measuring these relationships (e.g., Benight et al., 1999; Smith et al., 2011; and Thomas et al., 2011).

While few studies have assessed the relationship between optimism and posttraumatic growth, effect sizes for this relationship appear to be mixed. In their study of German motor vehicle accident survivors, Zoellner et al., (2008) hypothesized that optimism would relate positively to posttraumatic growth. However, their findings showed a small negative correlation between these two constructs ($r = -.05$, ns). Close

examination revealed that this relationship was moderated by reported PTSD symptoms such that individuals reporting more severe PTSD symptoms evidenced a positive relationship between optimism and posttraumatic growth while individuals reporting fewer severe PTSD symptoms showed a negative relationship between optimism and posttraumatic growth. Optimistic thinking patterns may be more efficacious for individuals who initially struggle to adjust before going on to grow following trauma. In a recent meta-analysis of studies relating optimism to posttraumatic growth, some studies yielded significant positive effect sizes, other studies yielded significant negative effect sizes, and additional studies showed evidence of null effect sizes (Bostock, Sheikh, & Barton, 2009). This analysis was based on a relatively small number of studies ($k=12$) which investigated optimism and growth in the context of chronic health diagnoses, which may differ from other types of traumatic events. In addition, this analysis, like many current studies, did not account for possible cultural, social, or age related differences in optimism. Researchers have observed that the construct of optimism was created and studied nearly exclusively in Western, individualistic cultures. Positive expectancies about one's personal future may not relate to well-being or adjustment in the same way for members of collectivistic cultures as for members of individualistic cultures (Peterson, 2000). Similarly, positive expectancies for future events may not occur as commonly or relate as reliably to positive outcomes among members of marginalized groups in spite of optimistic beliefs (Peterson, 2000). Given the theoretical and empirical distinctions between the possible positive and negative relationships among optimism and posttraumatic adjustment, as well as the question of cross-cultural validity

of the optimism construct as it relates to adjustment, further research is needed to clarify the nature of the relationship between optimism and posttraumatic resilient adaptation.

In summary, social support, self-efficacy, self-esteem, spirituality, and optimism have evidenced positive correlations with adjustment to trauma, psychological adjustment, and posttraumatic growth. However, there remains some divergence in the size and direction (positive, negative, or null) of these correlations. These divergent findings may be the result of a variety of moderating variables, including demographic factors, study setting (e.g., community vs. medical setting), type of traumatic event, time since the traumatic event, and differing operationalizations of resilience and outcome variables. While the body of literature identifying and exploring the relations among resilience factors and indicators of positive adaptation has proven useful in describing resilient functioning among youth and adults, it has also uncovered many ways in which future research is needed to clarify the nature of each relationship. Specifically, the studies during the first wave of resilience research did not attend to the mechanisms or processes by which resilient functioning could be maintained (Luthar, 2006). Few of these studies examined individual, social, and community resilience factors simultaneously in a way that would allow for a comparison of the relative contributions of each factor to adaptive functioning. A clearer conceptualization of resilience processes across ecological systems would further describe correlational findings and inform preventive interventions designed to promote adaptive functioning in at-risk populations (Luthar, 2006).

Second Wave of Resilience Research: Resilience Processes

During the second wave of resilience research, particular attention was paid to identifying and understanding the processes by which protective factors foster resilient functioning in the context of adversity (Masten, 2007, 2011). Protective factors were defined as variables which moderated the relationships between risk factors and outcomes. Researchers hypothesized that protective factors operated within a buffering model. In this model, protective factors evidenced main effect relationships with both risk and outcome variables. They also functioned as moderators which either decreased the strength of the relationship between risk factors and maladjustment or changed the nature of this relationship by relating to positive adjustment. Self-efficacy for coping with stressful events, self-esteem, effective coping, optimism, and internal locus of control have emerged as protective factors which facilitate positive adjustment among youth and adults exposed to risk (Luthar, 2006; Bonanno et al., 2010; Hoge et al., 2010; Agaibi & Wilson, 2005). Of these protective factors, self-efficacy and social support have received particular research attention. Results from self-efficacy studies showed that at-risk children who demonstrated coping self-efficacy showed social, emotional, and behavioral adjustment rather than maladjustment in the context of risk (Luthar, 2006). In a population of adult motor vehicle accident survivors, coping self-efficacy significantly reduced the relationship between posttraumatic distress immediately following the accident and posttraumatic distress 90 days following the accident (Benight et al., 2008). Researchers have noted that protective factors such as self-efficacy not only function protectively among at-risk individuals, they also operate within a broader social and

environmental context. The development and expression of self-efficacy, for example, is influenced by learning experiences and caregiver responses (Bandura, 1977). Therefore, protective factors which moderate the relationships among risk factors and adjustment outcomes have been examined across broader social and environmental systems (Luthar, 2006). Findings from this body of research indicate that protective factors including social support effectively related to positive adaptation in the context of risk (Egeland, 2007; Masten, 2007). In a longitudinal study of socioeconomically disadvantaged families experiencing a variety of risk factors (e.g., young single parents, low education, unemployment, experience of trauma and daily hassles), Egeland (2007) found that social support moderated the relationship between insecure attachment and maladjustment such that children who initially demonstrated insecure attachments and later developed warm social relationships went on to show competent functioning. Children who did not go on to develop warm social relationships showed ongoing maladjustment (Egeland, 2007). These findings concerning the protective role of social support in moderating risk have been echoed in studies of adult hurricane survivors (Lowe, Chan, & Rhodes, 2010) and flood survivors (Fredman et al., 2010).

Together, findings from studies in the second wave of resilience research deepened the understanding of resilience as a developmental process. Several resilience factors, including self-efficacy and social support, have shown established positive correlations with adjustment outcomes. Many of these resilience factors were found to moderate the relationships between risk factors and maladjustment. Given these findings, it appears that resilience factors act through two main processes. The first process, which

emerged in the first wave of resilience research, involves direct relationships between resilience factors and adaptive functioning. In this process, increasing the number and strength of resilience factors increases the likelihood of positive functioning in the context of adversity. The second process, which emerged in the second wave of resilience research, involves moderator effects in which resilience factors reduce the strength of the relationship between risk and maladjustment. In this process, resilience factors buffer at-risk individuals from experiencing significant maladjustment. These processes occur across individual, social, and environmental levels (Masten & Coatsworth, 1998; Luthar, 2006). In light of these findings, research shifted toward identifying ways in which resilience factors can inform interventions designed to promote resilient adaptation in groups of at-risk youth and adults.

Third Wave of Resilience Research: Interventions

After gaining a clearer conceptualization of the mechanisms behind resilient adaptation in the context of risk, researchers in the third wave of resilience research turned toward developing, implementing, and evaluating preventive interventions designed to promote competence in the face of adversity. Based on the risk factors and resilience factors identified during the first and second waves of resilience research, several researchers put forth recommendations for effective youth programs. During the development phase of youth programs, recommendations highlighted the need for attention to research and theory concerning the main and interactive effects among risk and resilience factors across systems (Black & Krishnakumar, 1998; Weissberg et al., 2003). During the program delivery phase, recommendations identified the need to

provide a comprehensive array of socioculturally relevant interventions using a variety of active teaching methods by trained staff on a regular basis (Nation et al., 2003). During the evaluation phase, recommendations focused on gathering data using designs that were methodologically sound and analyzing results using statistical techniques that were appropriately rigorous (Biglan et al., 2003). Several initial programs following these recommendations began to show promising findings. A meta-analysis of 177 randomized controlled trials of primary prevention programs designed to enhance competent functioning and prevent maladjustment among youth showed that most programs effectively promoted positive adjustment (effect sizes ranging from $d=.24$ to $d=.93$; Durlak & Wells, 1997).

Among adults, intervention efforts have focused primarily on promoting positive adjustment and preventing the development of psychological disorders following traumatic events. Several evidence based treatments, including Cognitive Processing Therapy (Resick & Schnicke, 1993) and Prolonged Exposure therapy (Foa & Rothbaum, 1998) have been developed based on cognitive behavioral theories, rigorously studied through randomized controlled trials, and found to be comparably effective (Resick et al., 2008), with promising mean effect sizes from meta-analyses of randomized controlled clinical trials (Hedge's $g = 1.08$; Powers et al., 2010). Relatively less attention has been given to developing and evaluating interventions which may prevent chronic maladjustment among trauma survivors. Early prevention efforts focused on the process of debriefing following trauma (Feldner, Monson, & Friedman, 2007; Litz et al., 2002; Wilson et al., 2000). Within the debriefing literature, perhaps the most commonly

recognized and widely used approach is Critical Incident Stress Debriefing (CISD). Reviews of randomized controlled CISD studies, however, have indicated that CISD is associated with an increase in the severity and duration of reported PTSD symptoms when compared with control groups (Feldner, Monson, & Friedman, 2007; Litz et al., 2002), leading many researchers to discourage the use of CISD as a preventive intervention for adults following trauma (Litz et al., 2002). More recent efforts involving indicated prevention programs designed to prevent chronic PTSD have focused on psychoeducation and brief interventions provided to trauma survivors (Feldner, Monson, & Friedman, 2007). Researchers have argued that the most effective psychoeducational efforts involve providing information that is relevant, appropriate in scope and depth, sensitive to cultural and contextual considerations, focused on resilience, and part of a larger intervention (Hobfoll, Walter, & Horsey, 2008; Ruzek, 2008; Rauch, Hembree, & Foa, 2001). While studies of psychoeducational interventions are few in number, reviews of this research have indicated that providing psychoeducation tends to produce neutral results with no appreciable decrease in PTSD symptoms (Bisson & Cohen, 2006). These neutral results could be due to the variability in content and presentation of psychoeducational programs included in existing research, with some programs effectively enhancing psychological adjustments. Another approach is the provision of brief interventions following traumatic experiences. Brief interventions include brief individual therapy sessions provided to individuals beginning to show symptoms of PTSD shortly following a traumatic event (Litz et al., 2002). Reviews of these findings have indicated that brief interventions show a great deal of promise for preventing

chronic PTSD, decreasing distress, and encouraging help-seeking behaviors among adult trauma survivors (Litz et al., 2002), though additional research is needed.

The findings of studies concerning effective development, implementation, and evaluation of programs designed to enhance adaptive functioning and prevent maladjustment in the context of risk have shown some initial evidence of efficacy. Among youth, primary prevention programs have been found to reliably predict adjustment (Durlak & Wells, 1994). Among adults, more targeted psychoeducation and brief preventive intervention programs have appeared promising, though additional randomized controlled trials are needed to build an evidence base (Litz et al., 2002). In light of these findings, the fourth wave of resilience research turned toward integrating and synthesizing findings across the previous waves into a coherent understanding of resilient adaptation across the lifespan.

Fourth Wave of Resilience Research: Integration and Looking Ahead

During the fourth wave of resilience research, analyses of resilience processes were broadened to include multiple levels of inquiry (Masten, 2007). Renewed interest was given to factors such as genes, brain processes, and behavioral neuroscience with the advent of new tools for imaging, mapping, and measuring the contributions of these factors (Cicchetti, 2010). The complex ways in which biological factors interact with individual characteristics, social contexts, and broader environmental processes began to receive attention from an increasingly interdisciplinary group of resilience researchers (Masten, 2007, 2011). The specific contributions of cultural factors in bolstering resilient adaptation among diverse populations began to emerge as vitally important pieces to

defining, measuring, and ultimately conceptualizing the resilience construct more globally (Masten, 2011; Luthar, 2006; Ungar, 2010). Researchers have investigated culturally specific resilience processes including the provision of support and education through racial socialization, practice of cultural traditions (e.g., language), development of a positive integrated racial identity, and transmission of ethnic pride. Findings indicate that these resilience processes relate positively to adaptation in the context of adversity among racial and ethnic minority individuals (Luthar, 2006; Ungar, 2010; Castro & Murray, 2010; Arbona & Coleman, 2008; Garcia Coll et al., 1996).

Although research within the fourth wave is in the early phases, emerging findings have identified areas of future empirical focus. Combining resilience factors across systems could prove particularly useful in engendering adaptive functioning in the context of risk (Masten, 2011). For example, the resilience factor of effective self-regulation could be measured by functional brain imaging scans and fostered by building individual coping skills, seeking social support from friends and mentors who effectively self-regulate, belonging to community organizations where self-regulatory behavior is normative (e.g., schools or workplaces), and engaging in culturally supported self-regulatory practices (e.g., attending spiritual services; Masten, 2011). As resilience research has moved toward multisystem and multilevel integration, a unique opportunity to evaluate the existing body of literature on resilience research has emerged.

Taking Stock: Critiques and Proposed Expansions of the Resilience Literature

As a whole, the four waves of research on resilience have produced a robust set of valuable findings. Across these waves of inquiry, resilience factors have been identified

and main effects relationships with positive outcomes have been uncovered. Protective factors which moderate these relationships have been studied. Based on these data, interventions have been developed and evaluated with an eventual goal of synthesizing findings across multiple systems and levels of development. As initial research reviews have begun the process of synthesizing research findings, however, several concerns have emerged regarding the rigor of theory and research on resilience to trauma and adversity (Luthar, 2006). Among these concerns is the observed variation in the definition of resilience, risk, adjustment, and posttraumatic growth processes (Luthar, 2006; Masten, 2011; Davydov et al., 2010). Notably, recent research efforts have questioned whether resilience and posttraumatic growth are adaptive constructs. Studies have reliably found positive correlations between posttraumatic growth and symptoms of psychological distress (Dekel et al., 2011). In addition, studies have shown that self-reported posttraumatic growth does not correlate with accomplishment of growth related tasks (Frazier et al., 2009). Recent researchers have argued that resilience and posttraumatic growth may be better understood as unique processes of adaptation rather than outcomes, and measured along a continuum of engagement in adjustment and growth related tasks (Hobfoll et al., 2007). The experience of initial maladjustment following trauma, then, may be a necessary precursor to resilient adaptation and growth (Tedeschi et al., 2007; Westphal & Bonanno, 2007). In light of these concerns, clarity concerning the nature of resilience and of posttraumatic growth is needed. Another concern is the seemingly fluid criteria by which resilience, adjustment, and growth outcomes are assessed, with a variety of different instruments and strategies used to measure these constructs (Luthar, 2006;

Bonanno et al., 2010). The end result of differing definitions and measurement strategies is variable observation of the rates of adjustment and maladjustment among individuals experiencing different types of risk. Research reviews have noted that using multiple methods to measure these constructs represents an area of strength for resilience research. These reviews have also noted that resilience constructs, trauma, adversity, maladjustment, adjustment, and growth must be defined clearly to ensure that multiple research methods tap into singular agreed upon definitions of resilience processes (Luthar, Cicchetti, & Becker, 2000). For the purpose of the present study, resilience is defined as a dynamic developmental process of adaptation in the face of adverse circumstances involving use of a flexible combination of internal competencies and contextual supports to aid in adjustment. Risk is defined as the experience of a traumatic event. Traumatic events are defined as events which are either directly experienced or witnessed and involve actual or threatened death, serious injury, threat to the physical integrity, and the emotional experience of fear, helplessness, or horror. Trauma adjustment is defined as a lack of PTSD symptoms, which include those specified in the most recent edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV-TR). Psychological adjustment is defined as a lack of symptoms of general distress or depression. Posttraumatic growth is defined as the experience of positive benefit and personal improvement following a traumatic event (Tedeschi & Calhoun, 1996).

An additional concern relates to the theoretical underpinnings of resilience research. Very few studies of resilience have embedded research questions, designs, and findings within a broader theoretical perspective. Reviews of resilience research have

underscored the importance of Ecological Systems Theory (Bronfenbrenner, 1977), which accounts for multiple systems and levels of biopsychosocial interactions in the theoretical conceptualization and empirical examination of resilience across the lifespan (Luthar, Cicchetti, & Becker, 2000; Masten, 2001; Davydov et al., 2010) and within the context of traumatic life events (McKeever & Huff, 2003). For the purpose of the present study, the analysis of risk, resilience, and adaptation is embedded in Ecological Systems Theory.

Together, these critiques of the resilience literature have highlighted conceptual, methodological, and theoretical concerns. Subsequent studies have attended to these critiques by taking care to define constructs, implement appropriate methods, and embed their findings within a broader systems theory perspective. Within the youth resilience literature, these efforts have resulted in a largely coherent body of findings (Luthar, 2006). While some variability continues to exist in resilient functioning over time, a reliable set of individual, social, cultural, and environmental resilience factors have been related to positive youth adaptation in the context of risk. The emerging literature on resilient functioning in adults, however, remains less cohesive. While relationships among resilience factors and indicators of adaptive functioning have been explored, they have not been analyzed systematically. As a result, several questions remain regarding the nature of these relationships.

One key concern is the nature of the relationships among resilience factors and positive adjustment outcomes. While some studies have found positive correlations among these variables, others have uncovered negative correlations (e.g., Luthar, 1991).

Traditionally, resilience theorists hypothesized that as resilience factors increase, so would individuals' reported adjustment (Masten, 2001). However, it may be the case that individuals who engage in resilient functioning in the context of adversity instead feel outside the norm, different from their peers, or estranged from their communities, resulting in dysthymic mood and dissatisfaction (Luthar, 2006). The present study sought to clarify the nature of the relationships among resilience factors including social support, self-efficacy, self-esteem, spirituality, and optimism with outcomes including trauma adjustment, psychological adjustment, and posttraumatic growth using meta-analytic techniques. Further, for any effect size showing significant heterogeneity indicative of highly variable effect size values, the present study sought to identify and analyze potential moderating variables. These moderating variables included demographic factors, methodological variables, time since trauma, setting characteristics, and trauma type. Moderators were selected based on research highlighting relationships between the moderating variable and trauma adjustment, psychological adjustment, or posttraumatic growth. Specifically, demographic moderators were selected based on meta-analytic relationships between female gender, younger age, and racial and ethnic minority group status and PTSD symptoms (Brewin, Andrews, & Valentine, 2000). Methodological variables were selected based on the observed variation among findings based on different measures and strategies (Luthar et al., 2000). Time since trauma was selected based on observed changes in the prevalence and course of PTSD symptoms over time (Resick et al., 2008). Setting variables were selected based on the observation that like different methodologies, different settings may account for some variation in outcomes in

the study of resilience (Luthar et al., 2000). Trauma type was selected as a moderator due to the findings that prevalence rates of adjustment and maladjustment vary across trauma types (Bonanno et al., 2010). Given that each hypothesized moderator accounted for systematic variation in findings across previous resilience studies, these variables may moderate the meta-analytic relationships among resilience factors and adjustment outcomes in the present study.

A third key concern is the relative contributions of individual and contextual (e.g., social) resilience factors as they relate to adaptive functioning. While resilience researchers originally hypothesized that fostering individual factors (e.g., self-efficacy) would bolster resilient functioning, more recent findings have underscored the importance of enhancing contextual factors (e.g., social support) in promoting adaptive outcomes. A comparison of the relative contributions of individual and contextual resilience factors would further clarify the multilevel systemic nature of resilience processes and inform interventions designed to promote adaptive functioning. The present study sought to compare the contributions of individual and social resilience factors to positive adjustment outcomes following trauma.

Finally, within the adult literature, methodologically strong meta-analytic investigations have identified and clarified the relationships among a small set of demographic, individual, peritraumatic, and contextual risk factors to PTSD (Brewin et al., 2000; Ozer et al., 2003). In the years following these meta-analyses, research has focused on identifying and broadening the understanding of resilience factors which relate to positive posttraumatic adjustment. These resilience factors have emerged as

unique variables rather than the inverse of risk variables. Similarly, psychological adjustment, well-being, and posttraumatic growth outcomes represent unique aspects of adaptation rather than the inverse of psychopathology. The contributions of individual and contextual resilience factors to positive adjustment and posttraumatic growth in the presence of risk have not yet been organized systematically in the way that the contributions of risk factors to PTSD have been. Therefore, in order to organize and clarify the body of literature concerning the relationships of individual and contextual resilience factors to positive adjustment outcomes among adults, the present paper presents a meta-analytic investigation of these relationships.

CHAPTER THREE

METHODOLOGY

The present study is a meta-analysis of the relationships among resilience factors (social support, self-efficacy, self-esteem, spirituality, and optimism) and positive adjustment outcomes (adjustment to trauma, psychological adjustment, and posttraumatic growth) among adults who have survived traumatic life events. The meta-analytic procedures used to assess these relationships are described in detail below. These procedures include study selection and inclusion criteria, coding of relevant variables, calculation of mean effect sizes, and analyses of moderation.

Study Selection and Inclusion Criteria

In order to locate relevant studies for the present meta-analysis, an extensive literature search was undertaken. In the first step of the literature search process, a computer search of the PsycINFO online database was completed. Search terms included the following keywords: resilience, resilience (psychological), trauma, posttraumatic stress disorder, PTSD, adjustment, psychological adjustment, posttraumatic growth, subjective well-being, social support, self-efficacy, self-esteem, spirituality, hope, and optimism. Search results were limited to English language studies. Based on the search results, an initial sample of 13,736 articles was compiled. Due to this large number of articles, search results were further limited to published articles from peer reviewed

journals. Limiting the number of articles in this way ensured that the methodology of each included study met the quality standards of peer review. It also may have introduced publication bias into the meta-analysis, as published studies may differ from unpublished studies in several ways. Specifically, authors have noted that unpublished studies may be more likely to contain null findings (e.g., Lipsey & Wilson, 2001). Excluding studies with null findings may inflate the effect size estimates obtained through meta-analysis. This “file drawer problem” (Rosenthal, 1979) can be addressed most effectively by including unpublished studies which may otherwise remain in the file drawer (Lipsey & Wilson, 2001). It may also be addressed in the process of meta-analysis by determining whether additional null findings from the file drawer would influence meta-analytic results, and interpreting effect sizes accordingly. Throughout the present meta-analytic process, steps were taken to determine whether including additional nonsignificant effect sizes would greatly influence the findings.

A brief review of the articles identified through the database search process was conducted, and the reference lists from relevant articles were examined thoroughly for additional studies. Similarly, the reference lists from several literature review articles and book chapters were searched for studies relevant to the meta-analysis. The names of researchers who were frequently cited in the obtained studies were entered into the Social Science Citation Index online database. Results from cited author searches, however, identified only studies that had been previously obtained through the above search methods. Finally, the tables of contents from a number of prominent journals in counseling psychology (e.g., *Journal of Counseling Psychology*) and clinical psychology

(e.g., Journal of Traumatic Stress, Journal of Consulting and Clinical Psychology) were examined for any further relevant articles.

Titles and abstracts of identified articles were reviewed closely to assess for three key inclusion criteria. The first inclusion criterion involved methodological characteristics. In order to meet methodological inclusion criteria, identified articles were quantitative in nature and contained: (1) measurement of at least one relevant resilience factor (e.g., social support, self-efficacy, self-esteem, spirituality, hope, or optimism), (2) measurement of at least one relevant psychological outcome (e.g., adjustment to trauma as indicated by scores on a measure of traumatic stress symptoms, psychological adjustment as indicated by scores on a symptom inventory, subjective well-being as indicated by scores on measures of positive affect and life satisfaction, or posttraumatic growth as indicated by scores on a measure of growth or benefit finding), and (3) report of effect sizes or sufficient statistical information to calculate effect size estimates (Pearson's r was used as the effect size for this study). For studies involving an intervention component, effect sizes were selected from baseline, pre-intervention data in order to control for the effects of the intervention on the outcomes measured. All effect sizes selected for coding were measured no less than two months and no more than fifty years following the traumatic event. Only effect sizes for which the resilience factors and outcomes had been measured at the same data collection point were included. While several longitudinal studies were identified, there were too few longitudinal effect sizes to examine meta-analytically.

A second inclusion criterion was that the study participants reported experiencing at least one traumatic life event. While definitions of trauma have varied greatly in the literature, studies included in this meta-analysis focused on traumatic events which were directly experienced or indirectly witnessed and involved (1) actual or threatened death, serious injury, threat to personal physical integrity, and (2) the emotional experience of fear, helplessness, or horror, in accordance with the definition in the current Diagnostic and Statistical Manual of Mental Disorders (DSM-IV, APA, 1994). Traumatic events which occurred externally to the person were included (e.g., natural disaster, combat, mass conflict/displacement, assault, motor vehicle accident, other life threatening accident) while traumatic events which occurred internally due to health concerns (e.g., cancer diagnosis) or due to developmental processes (e.g., aging) were not included in the present meta-analysis. Internal events related to health and aging likely involve complex biological responses (e.g., immune response to treatment) which are unique to these life circumstances. Comparison between these internal events and external traumatic events would need to address and account for these differences, which is beyond the scope of the current study.

A third inclusion criterion was that the study examined an adult population age 18 or older. While many children experience adversity and trauma, the process of assessing and treating traumatic sequelae differs between children and adults. Some authors have noted that some outcomes following traumatic stress seem to be more commonly measured among adults than among children (e.g., posttraumatic growth; Helgeson, Reynolds, & Tomich, 2006). In addition, while the literature concerning resilience

processes among youth has been closely explored and analyzed, the literature concerning resilience processes among adults has yet to be systematically organized. Therefore, the present meta-analysis focuses on organizing and evaluating the relationships among resilience factors and positive outcomes in an adult population.

Of the articles identified and reviewed in the literature search process, 127 met initial inclusion criteria. A reference list of these articles was created, and coding was completed by two independent coders. Differences in coding were resolved through discussion when they arose.

Variables Coded

A comprehensive codebook (see Appendix A) was developed to collect relevant information from each study. For each coded article, the following information was recorded: (1) complete citation of the article, (2) study design (prospective, retrospective), (3) year of publication, (4) sample size (women, men, and total), (5) sample demographic information (nationality, race, ethnicity, socioeconomic status), (6) sample age (mean and standard deviation), (7) setting (community, VA, hospital, university, first responder), (8) type of traumatic event (natural disaster, combat, mass conflict or displacement, physical assault, sexual assault, interpersonal violence, motor vehicle accident, other traumatic accident), (9) names of the variables measured, (10) operational definition of each variable, (11) instruments used to measure each variable, (12) reliability estimates for each measure, (13) means, standard deviations, and ranges of scores on each measure, (14) effect sizes for relationships between resilience factors and psychological outcomes, and (15) any notes regarding possible methodological influences on the study's findings.

During the coding process, several challenges emerged with studies measuring subjective well-being. Only one study operationalized and measured subjective well-being as a combination of positive affect and life satisfaction. Other studies measured self-reports of a global sense of well-being or psychological well-being. Both of these constructs differ conceptually from subjective well-being, and these differences complicated the process of combining and interpreting effect sizes. In addition, the effect sizes of the relationships between subjective well-being and resilience factors were few in number and highly variable. Due to differences in operationalization and measurement, small k , and high variability in outcomes, studies analyzing subjective well-being were excluded from the meta-analysis. A final total of 233 independent effect sizes from 122 studies found in 113 articles were coded. Many studies analyzed multiple variables of interest and reported multiple relevant effect sizes. No more than one effect size from each study was entered into each meta-analytic mean effect size calculation.

Calculation of Effect Sizes

Separate overall effect size estimates were calculated and reported for each resilience factor as it related to each psychological outcome variable. Calculations were performed in Microsoft Excel using equations discussed in Lipsey & Wilson (2001). The effect size estimates reported in the present meta-analyses are unbiased correlation coefficients (r_u ; Hedges & Olkin, 1985). These effect size estimates were calculated based on correlation coefficients (Pearson's r) reported in each study. For studies which did not report correlations, F values with one degree of freedom in the numerator from one-way ANOVA results were transformed into r values. Reported or obtained

correlation coefficients for relationships between resilience factors and psychological outcomes were corrected for measurement error on both variables using the following formula:

$$r_c = r_{xy} / \sqrt{(r_{xx})(r_{yy})}$$

When reliability information was not reported, average reliability values from other studies measuring the identified relationship were imputed. Imputations were undertaken only when no more than 20% of effect sizes contributing to the identified relationship were missing reliability information. The corrected values of r were then converted to Fischer's z scores using the following equation in order to remove the negative bias inherent in calculation of r as an estimate of the population correlation ρ (Hedges & Olkin, 1985):

$$z_c = 0.5 * (\ln(1+r_c) - \ln(1-r_c))$$

Weights for each corrected value of r were computed based on a random effects model, which assumes that the total variance associated with each effect size (v_i^*) is comprised of both variance attributed to subject-level sampling error (v_i) and variance associated with random sources of error (v_θ ; Lipsey & Wilson, 2001). In order to correct for variance associated with random sources of error, however, an estimate of the random error term v_θ was needed. Calculation of this estimate was based on the calculation of additional variables. The newly transformed z scores were weighted by the corrected inverse variance due to subject-level sampling error ($v_i = N-3$) using the following formula for the corrected weighted z score:

$$w_{ci}z_{ci} = z_{ci}[(N-3)(r_{xx})(r_{yy})]$$

For each resilience factor, average effect sizes were computed for the relation to each psychological outcome:

$$z_{+} = \sum w_{ci} z_{ci} / \sum w_{ci}$$

In order to determine whether or not observed variability in effect size estimates is due to sampling error, homogeneity analyses were performed for all average effect sizes of the relationships between each resilience factor and each psychological outcome calculated above. For each average effect size, the following equation was used to test whether the component effect sizes are homogeneous:

$$Q_{z+} = \sum w_{ci} (z_i - z_{+})^2$$

The Q statistic is distributed as a chi-squared with k-1 degrees of freedom, when k represents the number of samples included in the calculation (Hedges & Olkin, 1985). If the obtained Q statistic does not exceed its critical value, then the null hypothesis of homogeneity among effect sizes is maintained, and further analyses will not proceed. In the present analysis, however, the obtained Q_{z+} statistic exceeded its critical value for all mean effect sizes. Therefore, in accordance with the random effects model, the variability among effect sizes was assumed to be due to a combination of both systematic differences in study characteristics and random sampling error. The Q_{z+} value was then used in fitting a random effects model to the obtained mean effect sizes.

In fitting a random effects model, variance associated with random sources of error (v_{θ}) was estimated and added into the above effect size estimation equations. The impact of random sources of error was calculated for each effect size:

$$v_{\theta} = (Q_{z+} - (k-1)) / (\sum w_i - (\sum w_i^2 / \sum w_i))$$

This estimate of random error was combined with the estimate of subject-level sampling error (v_i) to create a more accurate estimate of how these sources of error contribute to the total variance in effect sizes (v_i^*) when $v_i^* = v_i + v_0$. Each weight w_i in the equations used to calculate the above average effect sizes of the relations between each resilience factor and each psychological outcome was replaced with v_i^* , and calculations of new mean effect size values were undertaken:

$$z_{++} = \sum v_i^* z_{ci} / \sum v_i^*$$

These corrected mean effect size estimates were interpreted as the mean effect sizes for the relationships between each resilience factor and each psychological outcome.

Standard error and confidence intervals were reported for each average effect size z_{++} score using standard procedures:

$$SEz_{++} = \sqrt{1 / (\sum v_i^*)}$$

$$95\% \text{ Confidence Intervals } z_{++} = z_{++} \pm 1.96(SEz_{++})$$

Each average effect size z_{++} score and the 95% confidence interval values was converted into corrected r scores using standard z to r transformation tables (Hedges & Olkin, 1985).

Then, homogeneity analyses were conducted for each average effect size:

$$Q_{z_{++}} = \sum v_i^* (z_c - z_{++})^2$$

All but one mean effect size evidenced significant variability once random sources of error were analyzed. For these effect sizes, analyses of moderation were performed in order to further assess any systematic variability due to study or sample characteristics.

Finally, to address the “file drawer problem” of potentially introducing bias into meta-analytic findings by including only published studies, the fail-safe N statistic was

calculated for each mean effect size (Rosenthal, 1979; Lipsey & Wilson, 2001). The fail-safe N statistic provides an estimate of the number of nonsignificant effect sizes that would need to be included in the mean effect size calculation in order for the mean effect size to become nonsignificant. The following formula, originally developed by Orwin (1983) and refined by Lipsey and Wilson (2001), was used to calculate the fail-safe N for each mean effect size:

$$N = k * ((r_{++} / .01) - 1)$$

In this formula, the criterion null effect size was set to .01. The k value represented the number of studies in effect size calculation, and the r_{++} value represented the converted corrected mean effect size computed using the random effects model. The fail-safe N statistic was interpreted according to accepted heuristics (Rosenthal, 1991), which posit that the meta-analytic findings are robust to the file drawer problem when the following conditions are met:

$$N > 5k + 10$$

According to this heuristic, all of the meta-analytic effect sizes were robust to the file drawer problem.

Analyses of Moderation

Original hypotheses posited that significant variability among effect sizes after sampling error and random error were corrected was likely due to a combination of moderating factors. Hypothesized moderators included demographic variables (gender, age, nationality, and racial/ethnic background), study variables (setting, date of publication, measurement), and trauma variables (type of trauma, time since trauma).

Each of these variables was expected to independently account for a portion of the variance in mean effect size estimates.

During the coding process, it became clear that all studies except one were published after the latest issue of the DSM-IV (published in 1994). All studies except one were therefore conducted based on the same set of criteria defining posttraumatic stress disorder and maladjustment as measured by symptoms of other disorders (e.g., depression). No other notable differences based on publication date were identified. Hypotheses regarding date of publication acting as a moderating variable were therefore revised, and date of publication was not assessed as a potential moderator.

In order to determine whether the remaining hypothesized moderating variables accounted for significant variance in effect sizes for the relationships between resilience factors and psychological outcomes, a series of weighted regression analyses was performed. For each average effect size with a significant Q_{z++} statistic derived from the random effects analysis described above, a moderation analysis was conducted. First, the hypothesized moderating variables were entered into separate weighted least squares regression models to test for moderator effects. Each of these regression equations was weighted by the inverse variance term (v_i) according to procedures described by Lipsey and Wilson (2001). All regression models were calculated using the SPSS statistical program. While useful for regression equation building, SPSS conducts weighted least squares regression based on assumptions required for fitting linear models rather than assumptions required for meta-analysis (Lipsey & Wilson, 2001). Therefore, regression output was examined closely, and additional calculations were performed to assess for

the significance of each model (Lipsey & Wilson, 2001). Specifically, the Q due to the regression (Q_R) was examined to determine whether each weighted regression model accounted for significant variance in effect sizes. The Q_R term is presented as the regression sum of squares in the ANOVA table generated as part of the output of weighted least squares regression in SPSS. It is distributed as a chi-squared statistic with $p-1$ degrees of freedom (p = number of predictors in the model), and its critical value is found in standard chi-squared tables. A significant value of Q_R indicates that a significant amount of variance in effect sizes is accounted for by the moderation model. In addition, the Q not accounted for by the regression (Q_E) was examined to determine whether significant variance in effect sizes remained after the regression equation was computed. The Q_E term is presented as the residual sum of squares in the ANOVA table generated as part of the output of weighted least squares regression in SPSS. It is distributed as a chi-squared statistic with $k-p-1$ degrees of freedom (k = number of effect sizes, p = number of predictors in the model), and its critical value is found in standard chi-squared tables. A significant value of Q_E indicates that a large amount of residual variance exists within the model.

Within each regression equation, beta weights were examined in order to assess the unique variance accounted for by each predictor in the equation. In order to interpret the significance of beta weights, however, additional calculations were necessary. Standard error terms were corrected for each predictor in the regression model:

$$SE_c = SE / \sqrt{\text{mean square residual}}$$

Corrected standard error terms were used to calculate significance terms for each unstandardized B coefficient and each standardized beta weight. Significance terms for these coefficients were calculated as z scores:

$$z = B / SE_c$$

Finally, separate effect sizes were calculated for moderating variables in order to demonstrate moderator effects. For example, mean effect sizes for studies with mostly female populations were separated from mean effect sizes for studies with mostly male populations in order to illustrate the effect of gender as a moderator.

CHAPTER FOUR

RESULTS

The present study is a meta-analysis of the relationships among resilience factors and positive adjustment outcomes. The final set of resilience variables included in the analysis was social support, self-efficacy, self-esteem, spirituality, and optimism. The final set of outcome variables included in the analysis was adjustment to trauma, psychological adjustment, and posttraumatic growth. Adjustment to trauma was defined as the absence of posttraumatic stress symptoms. Psychological adjustment was conceptualized as the absence of general symptoms of maladjustment such as depressed mood, worry, and global distress. Posttraumatic growth was defined as the experience of positive meaning and personal improvement following trauma. Results are first presented for the demographic, setting, and trauma characteristics of the studies included in the analysis. Next, findings from the mean effect size calculations for the relationships among each resilience factor and each outcome are reviewed. Analyses of heterogeneity within each effect size are described. Finally, results of the moderator analyses for each effect size showing significant heterogeneity are presented.

Study Characteristics

A total of 122 studies from 113 articles was included in the meta-analysis. Descriptive information from these studies is presented in Table 1. Studies represented a

total population of 39,330 adults. Of these, 19,180 (48.8%) were men, 19,078 (48.5%) were women, and 1,072 (2.7%) did not report gender. The mean age of participants was 39.09 (SD = 9.72).

Study participants represented diverse racial, ethnic, and national backgrounds. A total of 23,671 (60.2%) participants completed studies while residing in the United States. These US participants represented a relatively racially diverse population, with 12,503 (31.8%) of participants identifying as Caucasian; 5,378 (13.7%) identifying as African American; 1,852 (4.7%) identifying as Latino or Latina; 370 (0.9%) identifying as Asian American; and 235 (0.6%) identifying as Native American. Many US participants did not report racial background (n=3,288, 8.4%). A total of 11,256 (28.6%) participants represented international populations from nearly every continent. Of these international participants, a total of 3,115 (7.9%) were from Asian countries including Taiwan and Tibet; 2,793 (7.1%) were from African countries including Congo and the Sudan; 1,939 (4.9%) were from Middle Eastern countries including Israel, Palestine, Kuwait, and Eastern Turkey; 1,885 (4.8%) were from European countries including Britain, Switzerland, Belgium, Germany, Denmark, Poland, and Albania; 786 (2.0%) were from Australia and New Zealand (including participants of Maori descent), 557 (1.4%) were from Mexico, and 181 (0.5%) were Canadian. A total of 4,403 (11.2%) participants did not report information regarding racial, ethnic, or national background.

Studies included in the meta-analysis were conducted in a variety of settings. A total of 13,078 (33.3%) of participants completed studies within community settings (e.g., responded to research flyers in community centers). A total of 9,866 (25.1%) completed

studies within Veteran's Affairs settings, and 3,002 (7.6%) completed studies within medical center settings. A total of 6,214 (15.8%) of participants completed studies within college or university settings, and 155 (0.4%) were first responders who reported trauma in the context of their work settings (e.g., firefighting). A total of 7,015 (17.8%) of participants completed studies that were either conducted in other settings (e.g., correctional mental health institutions) or did not report setting information.

In addition to representing diverse populations across varied settings, studies included in the meta-analysis examined resilience processes following a variety of traumatic events. Many participants identified their most stressful traumatic events as related to combat ($n=8,732$, 22.2%) or the civilian experience of mass conflict ($n=7,462$, 19.0%). Others reported experiencing natural disasters ($n=6,039$, 15.4%), motor vehicle accidents ($n=1,182$, 4.6%), or spinal cord injury resulting from motor vehicle accidents ($n=211$, 0.5%). Studies involving spinal cord injury survivors were screened to ensure that participants were not experiencing brain injury or cognitive impairment as a result of their injuries, as these conditions may impact the process of resilient adjustment following trauma. Several participants reported assault experiences, including physical assault ($n=2,178$, 5.5%), sexual assault ($n=4,166$, 10.6%), and interpersonal violence ($n=1,185$, 3.0%). A total of 7,546 (19.2%) either reported experiencing another traumatic event (e.g., witnessing the death of a loved one) or declined to report their most stressful traumatic event.

Table 1. Study and Participant Characteristics

Variable	Number (N=39,330)	Percent
Demographic Characteristics		
Gender		
Male	19,180	48.8%
Female	19,078	48.5%
Age		
Mean	39.09	
Standard Deviation	9.72	
Population Sampled from US	23,671	60.2%
African American	5,387	13.7%
Native American	235	0.6%
Asian American	370	0.9%
Hispanic	1,852	4.7%
Caucasian	12,503	31.8%
Mixed Racial Background	36	0.1%
Unknown Racial Background	3,288	8.4%
Population Sampled Internationally	11,256	28.6%
African	2,793	7.1%
Asian	3,115	7.9%
Australia/New Zealand	786	2.0%
Middle Eastern	1,939	4.9%
European	1,885	4.8%
Mexican	557	1.4%
Canadian	181	0.5%
Unknown Nationality	4,403	11.2%
Setting Characteristics		
Community	13,078	33.3%
Veteran's Affairs	9,866	25.1%
Medical Center	3,002	7.6%
College	6,214	15.8%
First Responder	155	0.4%
Other/Unspecified Setting	7,015	17.8%
Trauma Characteristics		
Natural Disaster	6,038	15.4%
Combat	8,732	22.2%
Mass Conflict/Displacement	7,462	19.0%
Physical Assault	2,178	5.5%
Sexual Assault	4,166	10.6%
Interpersonal Violence	1,185	3.0%

Motor Vehicle Accident	1,812	4.6%
Spinal Cord Injury	211	0.5%
Other/Unknown Trauma	7,546	19.2%

*percents may not add to 100% due to rounding

Mean Effect Sizes for Resilience Factors and Adjustment to Trauma

Mean effect sizes were calculated for the relationships between resilience factors and adjustment to trauma. All effect sizes are unbiased correlation coefficients.

Historically, correlation coefficient effect sizes are considered small when they are less than $r=.10$, medium when $r=.25$, and large when $r=.40$ or greater (Cohen, 1988, as cited in Lipsey & Wilson, 2001). For the present meta-analysis, 95% confidence intervals were established around each effect size. When these confidence intervals did not include zero, the effect size was described as statistically significant at the $p<.05$ level.

The first research hypothesis was that the resilience factors of social support, self-efficacy, self-esteem, spirituality, and optimism would relate positively to adjustment to trauma. Table 2 presents the mean effect size values for the relationships between each resilience factor and adjustment to trauma. Social support, self-efficacy, self-esteem, and optimism all show significant positive effect sizes in their relationships to trauma adjustment. Large effect sizes were evident for both self-efficacy and self-esteem, and medium effect sizes emerged for both social support and optimism. However, spirituality showed a small but significant negative relationship with adjustment to trauma. Fail-safe N analyses indicate that all effect sizes were robust to the file drawer problem. Therefore, for all effect sizes, a large number of unpublished null findings would be needed to reduce the existing effect size to a nonsignificant value.

Table 2. Mean Effect Sizes (r) for Resilience Factors and Adjustment to Trauma

Variable	k	ES	95% CI	Q	Fail-Safe <i>N</i>
Social Support	62	.25*	.23-.06	1085.97**	1488
Self-Efficacy	25	.44*	.42-.46	1121.3**	1075
Self-Esteem	14	.41*	.37-.44	80.97**	560
Spirituality	13	-.09*	-.11--.06	21.76*	130
Optimism	10	.28*	.25-.31	12.26	270

* $p < .05$ ** $p < .01$

Moderators of Effect Sizes between Resilience Factors and Adjustment to Trauma

The second research hypothesis posited that effect sizes showing significant heterogeneity after accounting for both systematic and random error would be moderated by demographic, setting, and trauma related variables. Hypothesized demographic moderators include gender, age, national background, and racial/ethnic background. Significant heterogeneity emerged in all effect sizes except for the relationship between optimism and adjustment to trauma. The effect size between optimism and adjustment to trauma was therefore excluded from moderator analyses.

Demographic Moderators

Table 3 presents findings from the analysis of demographic variables as moderators of the relationships between each resilience factor and adjustment to trauma. Gender significantly moderated the effect sizes of social support (Q_R (1df) = 24.09, $p < .05$), self-efficacy (Q_R (1df) = 23.94, $p < .05$), and spirituality (Q_R (1df) = 8.95, $p < .05$) as they related to adjustment to trauma. As the percentage of women participants increased, the effect sizes of social support (beta = -.17, $p < .05$) and self-efficacy (beta = -

.21, $p < .05$) decreased as they related to trauma adjustment, while the effect size between spirituality and adjustment to trauma became less strongly negative ($\beta = .68$, $p < .05$). Follow-up analyses showed evidence of stronger associations among studies with a majority of male participants than among studies with a majority of female participants for social support, self-efficacy, and spirituality in relation to trauma adjustment. Gender did not account for significant variance in the relationship between self-esteem and adjustment to trauma (Q_R (1df) = 1.91, $\beta = -.17$, $p > .05$).

Age emerged as a significant moderator for social support (Q_R (1df) = 22.98, $p < .05$), self-efficacy (Q_R (1df) = 70.12, $p < .05$), and self-esteem (Q_R (1df) = 3.90, $p < .05$) as they related to adjustment to trauma. As the average age increased, the effect sizes of social support ($\beta = .17$, $p < .05$), self-efficacy ($\beta = .37$, $p < .05$), and self-esteem ($\beta = .25$, $p < .05$) increased as they related to trauma adjustment. Follow-up analyses showed stronger relationships among studies of older participants than among studies of younger participants for social support, self-efficacy, and self-esteem in relation to trauma adjustment. Age did not account for significant variance in the relationship between spirituality and adjustment to trauma (Q_R (1df) = .12, $\beta = -.08$, $p > .05$).

Nationality significantly moderated the relationship between social support and adjustment to trauma (Q_R (1df) = 99.57, $p < .05$). As the number of participants reporting US nationality increased, the effect size between social support and adjustment to trauma also increased ($\beta = .35$, $p < .05$). Follow-up analyses showed that populations sampled in the US showed a stronger positive association between social support and adjustment to trauma than populations sampled internationally. Nationality did not account for

significant variance in the effect sizes of self-efficacy (Q_R (1df) = .01, $\beta = .00$, $p > .05$), self-esteem (Q_R (1df) = .07, $\beta = -.03$, $p > .05$), or spirituality (Q_R (1df) = 2.63, $\beta = -.37$, $p > .05$) in relation to trauma adjustment.

Racial and ethnic background significantly moderated the effect sizes of social support (Q_R (1df) = 16.13, $p < .05$) and self-efficacy (Q_R (1df) = 21.88, $p < .05$) as they related to adjustment to trauma. As the number of participants reporting racial or ethnic minority status increased, the effect sizes increased for social support ($\beta = .19$, $p < .05$) but decreased for self-efficacy ($\beta = -.12$, $p < .05$) in relation to trauma adjustment. Follow-up analyses showed that the effect size between social support and trauma adjustment was stronger and more positive among studies of minority participants than among studies of Caucasian participants. However, the effect size between self-efficacy and trauma adjustment appeared to be stronger and more positive among studies of Caucasian participants than among studies of minority participants. Racial and ethnic background did not account for significant variance in the effect sizes of self-esteem (Q_R (1df) = 2.61, $\beta = .36$, $p > .05$) or spirituality (Q_R (1df) = .63, $\beta = -.22$, $p > .05$) in relation to trauma adjustment.

Table 3. Demographic Moderators of the Relationships between Resilience Factors and Adjustment to Trauma

Variable	Q_R	β	Gender			
			0-49% Female		50-100% Female	
			k	ES	k	ES
Social Support	2.60	-.17*	28	.34*	31	.19*
Self-Efficacy	23.94*	-.21*	7	.72*	17	.26*
Self-Esteem	1.91	-.17	5	.45*	10	.40*
Spirituality	8.95*	.68*	2	-.17*	11	-.07*

			Age			
			18-34 years old		35 years and older	
Variable	Q _R	Beta	k	ES	k	ES
Social Support	22.98*	.17*	22	.12*	31	.39*
Self-Efficacy	70.12*	.37*	8	.23*	15	.63*
Self-Esteem	3.90*	.25*	6	.33*	5	.50*
Spirituality	.12	-.08	7	-.08*	4	-.09*

			Nationality			
			US Sample		International Sample	
Variable	Q _R	Beta	k	ES	k	ES
Social Support	99.57*	.35*	37	.34*	22	.14*
Self-Efficacy	.04	.00	15	.42*	10	.46*
Self-Esteem	.07	.07	10	.41*	4	.41*
Spirituality	2.63	-.37	8	-.05*	5	-.10*

			Racial/Ethnic Background					
			Over 50% Minority		Over 50% Caucasian		Mixed Racial Background	
Variable	Q _R	Beta	k	ES	k	ES	k	ES
Social Support	16.13*	.19*	12	.37*	24	.26*	7	.34*
Self-Efficacy	21.88*	-.12*	5	.28*	9	.62*		
Self-Esteem	2.61	.36	3	.39*	6	.31*		
Spirituality	.63	-.22	5	-.12	3	-.01		

*p<.05

Setting Moderators

Table 4 presents findings from the analysis of setting variables as moderators of the relationships between each resilience factor and adjustment to trauma. Analyses of setting as a moderating variable operationalized setting as whether or not the study was conducted in the following research settings: community, Veteran's Affairs (VA), medical center, college, and first responder workplace. Effect sizes from studies conducted within each of these settings were analyzed separately. Setting significantly moderated the effect sizes of social support (Q_R (5df) = 205.53, $p < .05$), self-efficacy (Q_R (5df) = 411.81, $p < .05$), and self-esteem (Q_R (5df) = 19.48, $p < .05$) as they related to adjustment to trauma. Setting did not significantly moderate the effect size of the

relationship between spirituality and adjustment to trauma (Q_R (5df) = 7.09, $p > .05$).

Participation in medical settings (e.g., VA, medical center) appeared to yield stronger and more positive effect sizes than participation in community, college, and workplace settings. With the exception of spirituality, effect sizes between resilience factors and adjustment to trauma were positive and significant across settings.

Trauma Moderators

Table 4 also presents findings from the analysis of trauma variables as moderators of the relationships between each resilience factor and adjustment to trauma. Analyses of trauma type as a moderating variable operationalized trauma type as whether or not a majority of participants in the study reported experiencing one the following traumatic events: natural disaster, accident, mass conflict, assault, or combat. The natural disaster category was comprised of hurricanes, earthquakes, and floods. The accident category was comprised of motor vehicle accidents and injuries sustained during a traumatic accident (e.g., spinal cord injury). The assault category was comprised of physical assault, sexual assault, and interpersonal violence. Effect sizes from studies with participants reporting each of these trauma types were analyzed separately when possible. Trauma type significantly moderated the effect sizes of social support (Q_R (5df) = 309.56, $p < .05$), self-efficacy (Q_R (5df) = 178.17, $p < .05$), and self-esteem (Q_R (5df) = 43.55, $p < .05$) as they related to adjustment to trauma. Trauma type did not, however, significantly moderate the effect size of the relationship between spirituality and adjustment to trauma (Q_R (5df) = 9.00, $p > .05$). Traumatic events arising from incidental environmental circumstances (e.g., accidents) showed stronger and more positive effect sizes than events

arising from sociopolitical environmental circumstances (e.g., combat, mass conflict) and natural disasters. Traumatic events arising from interpersonal transgressions (e.g., assaults) showed the smallest effect sizes. With the exception of spirituality, effect sizes between resilience factors and adjustment to trauma were positive and significant across different types of traumatic events.

In addition to trauma type, the amount of time since the traumatic event occurred was also analyzed as a moderating variable. Time since the traumatic event was operationalized as the mean amount of time, in months, after the traumatic event. Across studies, time since the traumatic event fell into four categories: zero to six months, six to twelve months, one to ten years, and more than ten years. Effect sizes from studies with each of these timeframes were analyzed separately when possible. Time since the traumatic event significantly moderated the effect sizes of social support (Q_R (3df) = 101.13, $p < .05$), self-efficacy (Q_R (3df) = 118.59, $p < .05$), and self-esteem (Q_R (3df) = 22.53, $p < .05$) as they related to adjustment to trauma. These effect sizes appeared to be stronger and more positive in both the acute time period (i.e., less than six months following the traumatic event) and the chronic time period (i.e., more than ten years following the traumatic event) than in the intervening time periods. Time since trauma did not significantly moderate the effect size of the relationship between spirituality and adjustment to trauma (Q_R (3df) = 6.74, $p > .05$). However, findings indicate that spirituality related positively to trauma adjustment within one year of the traumatic event ($r = .10$) and negatively to trauma adjustment more than one year after the traumatic event

Table 4. Setting and Trauma Related Moderators of the Relationships between Resilience Factors and Adjustment to Trauma

		Setting														
Variable	Q _R	Community			VA			Medical			College			First Responder		
		k	Beta	ES	k	Beta	ES	k	Beta	ES	k	Beta	ES	k	Beta	ES
Social Support	205.53*	24	-.13*	.20*	17	.45*	.41*	10	.07*	.29*	7	-.29*	.09*	5	-.19*	.11*
Self-Efficacy	411.81*	16	-.39*	.28*				5	.15*	.59*				2	-.07*	.27*
Self-Esteem	19.48*	6	-.12*	.40*				6	.38*	.50*						
Spirituality	7.09	6	.01	-.09*				3	.43	.03	3	.15	-.08			

		Trauma Type														
Variable	Q _R	Natural Disaster			Accident			Mass Conflict			Assault			Combat		
		k	Beta	ES	k	Beta	ES	k	Beta	ES	k	Beta	ES	k	Beta	ES
Social Support	308.56*	10	.12*	.19*	4	.14*	.42*	8	.13*	.21*	14	-.03	.17*	15	.59*	.45*
Self-Efficacy	178.17*	9	.24*	.44*	2	.28*	.80*	6	.61*	.63*	5	.09*	.30*			
Self-Esteem	43.55*	2	-.36*	.18*	2	.53*	.63*	2	.23*	.42*	4	-.02	.37*			
Spirituality	9.00							3	-.19	-.14*	3	.31	.10			

		Time Since Trauma											
Variable	Q _R	0-6 Months			6-11 Months			1-10 Years			More than 10 Years		
		k	Beta	ES	k	Beta	ES	k	Beta	ES	k	Beta	ES
Social Support	101.13*	8	.16*	.42*	12	.15*	.36*	18	-.38*	.18*	15	.22*	.39*
Self-Efficacy	118.59*	7	.13*	.55*	4	-.12*	.33*	7	-.35*	.19*	2	-.19*	.26*
Self-Esteem	22.53*	4	.35*	.50*	5	-.40*	.30*	3	.19	.42*	2	-.30*	.19*
Spirituality	6.74				2	.71*	.10	4	-.57*	-.12*			

*p<.05

($r = -.12$). Again, with the exception of spirituality, effect sizes between resilience factors and adjustment to trauma were positive and significant across time.

In summary, social support related positively to trauma adjustment ($r = .25$). This relationship was stronger for samples of participants who were older, male, residing in the US, and reported racial and ethnic minority status than for other participants. The relationship between social support and trauma adjustment was also stronger in VA settings and among survivors of combat trauma than in other settings. Self-efficacy also related positively to trauma adjustment ($r = .44$), and this relationship was stronger for participants who were older, male, and reported a Caucasian background than for other participants. This relationship was also stronger among accident survivors in medical settings than in survivors of other traumatic events in different locations. Similarly, self-esteem was positively related to trauma adjustment ($r = .41$), and this relationship was stronger for participants who were older, male, and reported a Caucasian background than for other participants. This relationship was also stronger among accident and assault survivors in medical settings than survivors of other traumatic events in other locations. Spirituality evidenced a negative relationship with trauma adjustment ($r = -.09$), and this negative effect size was stronger among males than among females. Optimism related positively to trauma adjustment ($r = .28$). The effect size for this relationship did not evidence significant heterogeneity, and further moderator analyses were not completed. Finally, results from the analysis of time moderators demonstrated that effect sizes appeared to be stronger and more positive in both the acute time period

(i.e., less than six months following the traumatic event) and the chronic time period (i.e., more than ten years following the traumatic event) than in the intervening time periods.

Mean Effect Sizes for Resilience Factors and Psychological Adjustment

Mean effect sizes were calculated for the relationships between resilience factors and psychological adjustment. The third research hypothesis was that the resilience factors of social support, self-efficacy, self-esteem, spirituality, and optimism would relate positively to psychological adjustment. Table 5 presents the mean effect size values for the relationships between each resilience factor and psychological adjustment. Social support, self-efficacy, self-esteem, and optimism all show significant positive effect sizes in their relationships to psychological adjustment. Large effect sizes were evident for self-efficacy, self-esteem, and optimism, and a small effect size emerged for social support. Due to a small number of studies examining the effect size between spirituality and psychological adjustment ($k=8$), this effect size was not included in the meta-analysis.

Table 5. Mean Effect Sizes (r) for Resilience Factors and Psychological Adjustment

Variable	k	ES	95% CI	Q	Fail-Safe N
Social Support	42	.21*	.19-.23	328.94**	840
Self-Efficacy	15	.58*	.56-.59	867.65**	855
Self-Esteem	10	.52*	.48-.56	98.06**	42
Optimism	11	.41*	.39-.44	62.74**	440

* $p<.05$, ** $p<.01$

Fail-safe N analyses indicate that all effect sizes except for the effect size between spirituality and psychological adjustment were robust to the file drawer problem.

Therefore, for most effect sizes, a large number of unpublished null findings would be needed to reduce the existing effect size to a nonsignificant value.

Moderators of Effect Sizes between Resilience Factors and Psychological

Adjustment

The fourth research hypothesis posited that effect sizes between resilience variables and adjustment outcomes showing significant heterogeneity after accounting for both systematic and random error would be moderated by demographic, setting, and trauma related variables. Significant heterogeneity emerged in all effect sizes.

Demographic Moderators

Table 6 presents findings from the analysis of demographic variables as moderators of the relationships between each resilience factor and psychological adjustment. Gender significantly moderated the effect sizes of self-efficacy ($Q_R (1df) = 32.62, p < .05$) and self-esteem ($Q_R (1df) = 4.85, p < .05$) as they related to psychological adjustment. As the percentage of women participants increased, the effect sizes of self-efficacy and self-esteem both decreased as they related to psychological adjustment ($\beta = -.34$ and $\beta = -.32, p < .05$, respectively). Follow-up analyses showed evidence of stronger associations among studies with a majority of male participants than among studies with a majority of female participants for these effect sizes. Gender did not significantly moderate the effect sizes of social support ($Q_R (1df) = 2.60, \beta = -.10, p > .05$) or optimism ($Q_R (1df) = .02, p > .05$) in relation to psychological adjustment.

Age emerged as a significant moderator for social support ($Q_R (1df) = 10.58, p < .05$), self-efficacy ($Q_R (1df) = 218.74, p < .05$), self-esteem ($Q_R (1df) = 6.66, p < .05$),

and optimism (Q_R (1df) = 9.60, $p < .05$) as they related to psychological adjustment. As the average age of participants increased, the effect sizes between each resilience factor and psychological adjustment also increased. Follow-up analyses showed stronger associations between resilience factors and psychological adjustment among studies of older participants than among studies of younger participants.

Nationality significantly moderated the effect sizes of social support (Q_R (1df) = 67.23, $p < .05$), self-efficacy (Q_R (1df) = 6.73, $p < .05$), and self-esteem (Q_R (1df) = 10.92, $p < .05$) in relation to psychological adjustment. As the number of participants reporting US nationality increased, the effect size for social support also increased ($\beta = .51$, $p < .05$). Conversely, as the number of international participants increased, the effect sizes of self-efficacy and self-esteem increased ($\beta = .16$ and $\beta = .48$, $p < .05$, respectively). Follow-up analyses demonstrated that US participants showed a stronger positive effect size than international participants for social support in relation to psychological adjustment. International participants showed stronger positive effect sizes than US participants for self-efficacy and self-esteem in relation to psychological adjustment. Nationality did not account for significant effect size variance in the relationship between optimism and psychological adjustment (Q_R (1df) = 2.46, $\beta = -.23$, $p > .05$).

Racial and ethnic background significantly moderated the effect sizes of social support (Q_R (1df) = 18.23, $p < .05$) and self-esteem (Q_R (1df) = 18.44, $p < .05$) as they related to psychological adjustment. As the number of participants reporting a Caucasian background increased, the effect sizes for social support and self-esteem also increased ($\beta = .27$ and $\beta = .79$, $p < .05$, respectively). Follow-up analyses confirmed that these

effect sizes were stronger and more positive for Caucasian participants than for participants belonging to racial and ethnic minority groups. Racial and ethnic background did not account for significant variance for self-efficacy (Q_R (1df) = 2.09, $\beta = -.09$, $p > .05$), spirituality (Q_R (1df) = .05, $\beta = -.09$, $p > .05$), or optimism (Q_R (1df) = .50, $\beta = .13$, $p > .05$) in relation to psychological adjustment.

Table 6. Demographic Moderators of the Relationships between Resilience Factors and Psychological Adjustment

			Gender					
			0-49% Female		50-100% Female			
Variable	Q _R	Beta	k	Effect Size	k	Effect Size		
Social Support	2.60	-.10*	28	.36*	25	.18*		
Self-Efficacy	32.62*	-.34*	3	.82*	11	.35*		
Self-Esteem	4.85*	-.32*	3	.62*	7	.48*		
Optimism	.02	-.02	5	.41*	6	.41*		
			Age					
			18-34 years old		35 years and older			
Variable	Q _R	Beta	k	Effect Size	k	Effect Size		
Social Support	10.58*	.17*	21	.16*	18	.28*		
Self-Efficacy	218.74*	.72*	6	.34*	5	.81*		
Self-Esteem	6.66*	.06*	6	.48*	4	.63*		
Optimism	9.60*	.54*	5	.45*	5	.55*		
			Nationality					
			US Sample		International Sample			
Variable	Q _R	Beta	k	Effect Size	k	Effect Size		
Social Support	67.23*	.51*	27	.31*	14	.10*		
Self-Efficacy	6.73*	.16*	9	.46*	6	.59*		
Self-Esteem	10.92*	.48*	6	.45*	4	.60*		
Optimism	2.46	-.23	7	.42*	4	.39*		
			Racial/Ethnic Background					
			Over 50% Minority		Over 50% Caucasian		Mixed Racial Background	
Variable	Q _R	Beta	k	ES	k	ES	k	ES
Social Support	18.23*	.27*	13	.30*	14	.33*	10	.30*
Self-Efficacy	2.09	-.09	5	.50*	4	.42*		
Self-Esteem	18.44*	.79*	2	.31*	4	.65*		
Optimism	.50	.13	2	.46*	5	.42*		

* $p < .05$

Setting Moderators

Table 7 presents findings from the analysis of setting variables as moderators of the relationships between each resilience factor and psychological adjustment. Setting significantly moderated the effect sizes of social support (Q_R (5df) = 117.81, $p < .05$), self-efficacy (Q_R (5df) = 251.63, $p < .05$), self-esteem (Q_R (5df) = 19.13, $p < .05$), and optimism (Q_R (5df) = 13.05, $p < .05$) as they related to psychological adjustment. Findings within each setting were somewhat variable. Participation in community settings appeared to yield stronger and more positive effect sizes for self-efficacy, self-esteem, and optimism than for social support. Participation in medical settings showed a stronger effect size for optimism than for self-esteem or social support. Participation in a college setting showed a stronger effect size for self-esteem than for self-efficacy or social support. Finally, participation in a first responder workplace showed large effect sizes for both social support and self-efficacy. Across settings, effect sizes between resilience factors and psychological adjustment were positive and statistically significant.

Trauma Moderators

Table 7 also presents findings from the analysis of trauma variables as moderators of the relationships between each resilience factor and psychological adjustment. Effect sizes from studies with participants reporting each trauma type were also analyzed separately when possible. Trauma type significantly moderated the effect sizes of social support (Q_R (5df) = 109.99, $p < .05$), self-efficacy (Q_R (5df) = 191.52, $p < .05$), self-esteem (Q_R (5df) = 37.50, $p < .05$), and optimism (Q_R (5df) = 27.50, $p < .05$) as they related to psychological adjustment. Findings within each trauma type were once again variable.

Traumatic events arising from incidental environmental circumstances (e.g., accidents, natural disasters) showed stronger and more positive effect sizes for self-efficacy, self-esteem, and optimism than for social support. Traumatic events arising from sociopolitical circumstances (e.g., mass conflict) showed stronger and more positive effect sizes for self-efficacy than for social support or optimism, though optimism did evidence a large effect size in the context of combat. Traumatic events arising from interpersonal transgressions (e.g., assaults) showed large effect sizes for both social support and self-esteem. Across trauma types, all effect sizes between resilience factors and psychological adjustment were positive and statistically significant.

In addition to trauma type, time since the traumatic event occurred was also analyzed as a moderating variable. Time since the traumatic event significantly moderated the effect sizes of social support (Q_R (3df) = 71.51, $p < .05$), self-efficacy (Q_R (3df) = 16.81, $p < .05$), and self-esteem (Q_R (3df) = 39.04, $p < .05$) as they related to psychological adjustment. These effect sizes appeared to be stronger and more positive in both the acute time period (i.e., less than six months following the traumatic event) and the chronic time period (i.e., more than ten years following the traumatic event) than in the intervening time periods. Time since the traumatic event also significantly moderated the relationship between optimism and psychological adjustment (Q_R (3df) = 16.56, $p < .05$), though this effect size appeared to be stronger during the six months to one year time period than during the acute time period. Again, effect sizes between resilience factors and psychological adjustment were positive and significant across time.

In summary, social support, self-efficacy, self-esteem, and optimism all show significant positive effect sizes in their relationships to psychological adjustment. Large effect sizes were evident for self-efficacy ($r = .58$), self-esteem ($r = .52$), and optimism ($r = .41$), and a small effect size emerged for social support ($r = .21$). Effect sizes for the relationships among resilience factors and psychological adjustment were moderated by demographic, setting, trauma, and time variables. Trends in the findings showed that effect sizes were stronger, on average, for samples of older and male participants than for younger and female participants. With regard to nationality and racial and ethnic background, findings were variable. Findings from the analysis of setting moderators were also variable, with social support showing smaller effect sizes than individual resilience factors in all settings except first responder workplaces. Findings from the analysis of trauma moderators were also somewhat variable, with social support again showing smaller effect sizes than individual resilience factors across trauma types. Finally, results from the analysis of time moderators demonstrated that effect sizes appeared to be stronger and more positive in both the acute time period (i.e., less than six months following the traumatic event) and the chronic time period (i.e., more than ten years following the traumatic event) than in the intervening time periods.

Mean Effect Sizes for Resilience Factors and Posttraumatic Growth

Mean effect sizes were calculated for the relationships between resilience factors and posttraumatic growth. The fifth research hypothesis was that the resilience factors of social support, self-efficacy, self-esteem, spirituality, and optimism would relate positively to posttraumatic growth. Only social support and spirituality contributed

Table 7. Setting and Trauma Related Moderators of the Relationships between Resilience Factors and Psychological Adjustment

Variable	Q _R	Setting														
		Community			VA			Medical			College			First Responder		
		k	Beta	ES	k	Beta	ES	k	Beta	ES	k	Beta	ES	k	Beta	ES
Social Support	117.81*	20	.18*	.26*				11	.22*	.31*	7	-.58*	.06*	3	.33*	.52*
Self-Efficacy	251.63*	10	-.10	.51*							2	-.79*	.30*	2	-.08	.45*
Self-Esteem	19.13*	3	.05	.53*				4	-.53*	.43*	3	.58*	.67*			
Optimism	13.05*	5	-.07	.42*	2	-.12	.40*	2	.52*	.63*						

Variable	Q _R	Trauma Type														
		Natural Disaster			Accident			Mass Conflict			Assault			Combat		
		k	Beta	ES	k	Beta	ES	k	Beta	ES	k	Beta	ES	k	Beta	ES
Social Support	109.99*	13	.44*	.25*	8	.12*	.23*	7	.40*	.30*	8	.30*	.39*			
Self-Efficacy	191.52*	7	.28*	.54*				3	.88*	.80*						
Self-Esteem	37.50*	2	-.32*	.52*	2	-.32*	.63*				4	-.18*	.41*			
Optimism	27.50*	3	.58*	.51*	2	.69*	.63*	3	-.17*	.26*				2	.36*	.40*

Variable	Q _R	Time Since Trauma											
		0-6 Months			6-11 Months			1-10 Years			More than 10 Years		
		k	Beta	ES	k	Beta	ES	k	Beta	ES	k	Beta	ES
Social Support	71.51*	6	.24*	.38*	12	.22*	.28*	18	.15*	.28*	6	.15*	.30*
Self-Efficacy	16.81*	7	-.02	.51*	5	-.18*	.45*	3	-.05	.50*			
Self-Esteem	39.04*	2	.12	.62*	3	-.77*	.37*				3	.65*	.68*
Optimism	16.56*	3	-.32*	.27*	6	-.00	.41*						

*p<.05

enough effect sizes for further analysis. Table 8 presents the mean effect size values for the relationships between these two resilience factors and posttraumatic growth. Social support and spirituality both showed significant positive effect sizes in their relationships to posttraumatic growth. A medium effect size was found for the relationship between spirituality and posttraumatic growth, while a small effect size was found for the relationship between social support and posttraumatic growth. Both mean effect sizes were positive and statistically significant.

Table 8. Main Effect Sizes (r) for Resilience Factors and Posttraumatic Growth

Variable	k	ES	95% CI	Q	Fail Safe N
Social Support	14	.21*	.18-.24	27.79**	280
Spirituality	11	.31*	.28-.34	90.66**	330

* $p < .05$

** $p < .01$

Fail-safe N analyses indicate that both effect sizes were robust to the file drawer problem. Therefore, for both effect sizes, a large number of unpublished null findings would be needed to reduce the existing effect sizes to a nonsignificant value.

Moderators of Effect Sizes between Resilience Factors and Posttraumatic Growth

The sixth research hypothesis posited that effect sizes between resilience variables and posttraumatic growth outcomes showing significant heterogeneity after accounting for both systematic and random error would be moderated by demographic, setting, and trauma related variables. Significant heterogeneity was found in both effect sizes.

Demographic Moderators

Table 9 presents findings from the analysis of demographic variables as moderators of the relationships between each resilience factor and posttraumatic growth. Gender significantly moderated the relationship between spirituality and posttraumatic growth (Q_R (1df) = 5.23, $p < .05$). As the percentage of women participants increased, the relationship between spirituality and posttraumatic growth decreased ($\beta = -.26$, $p < .05$). A stronger effect size was found among studies with a majority of male participants than among studies with a majority of female participants. Gender did not account for significant variance in the relationship between social support and posttraumatic growth (Q_R (1df) = 1.18, $p > .05$).

Age emerged as a significant moderator for both social support (Q_R (1df) = 12.04, $p < .05$) and spirituality (Q_R (1df) = 4.13, $p < .05$) as they related to posttraumatic growth. As the average age of participants increased, the effect size for social support decreased ($\beta = -.41$, $p < .05$) while the effect size for spirituality increased ($\beta = .25$, $p < .05$). Follow-up analyses showed a stronger association between social support and posttraumatic growth among younger participants than among older participants. Conversely, a stronger association was found between spirituality and posttraumatic growth among older participants than among younger participants.

Nationality significantly moderated the effect sizes of both social support (Q_R (1df) = 7.54, $p < .05$) and spirituality (Q_R (1df) = 34.73, $p < .05$) in relation to posttraumatic growth. As the number of participants reporting US nationality increased, the effect sizes for both social support and spirituality also increased ($\beta = .51$ and $\beta = .67$, $p < .05$,

respectively). Follow-up analyses confirmed that US participants showed stronger positive effect sizes than international participants for both social support and spirituality in relation to posttraumatic growth.

Racial and ethnic background did not significantly moderate the effect sizes of social support and spirituality as they related to posttraumatic growth. All studies investigating the relationship between social support and posttraumatic growth ($k=14$) either sampled a majority of Caucasian participants, or did not report the racial or ethnic background of the participants. For the relationship between spirituality and posttraumatic growth, racial and ethnic background did not account for significant variance in effect sizes in the regression model ($Q_R (1df) = 2.21, p>.05$). However, follow-up analyses showed that studies with populations consisting of a majority of racial and ethnic minority participants evidenced slightly smaller relationships between spirituality and posttraumatic growth than studies with populations consisting of a majority of Caucasian participants.

Table 9. Demographic Moderators of the Relationships between Resilience Factors and Posttraumatic Growth

Variable	Q_R	Beta	Gender			
			0-49% Female		50-100% Female	
			k	Effect Size	k	Effect Size
Social Support	1.18	-.20	8	.22*	7	.21*
Spirituality	5.23*	-.26*	3	.48*	8	.30*
Variable	Q_R	Beta	Age			
			18-34 years old		35 years and older	
			k	Effect Size	k	Effect Size
Social Support	12.04*	-.41*	4	.26*	7	.14*
Spirituality	4.13*	.25*	2	.21*	8	.33*
			Nationality			
			US Sample		International Sample	

Variable	Q _R	Beta	k	Effect Size	k	Effect Size
Social Support	7.54*	.51*	9	.25*	4	.16*
Spirituality	34.73*	.67*	7	.37*	4	.04
Racial/Ethnic Background						
			Over 50% Minority	Over 50% Caucasian	Mixed Racial Background	
Variable	Q _R	Beta	k	ES	k	ES
Spirituality	2.21	.44	2	.31*	6	.41*

*p<.05

Setting Moderators

Table 10 presents findings from the analysis of setting variables as moderators of the relationships between each resilience factor and posttraumatic growth. Effect sizes from studies conducted within each setting were analyzed separately when possible. Setting significantly moderated the effect size of spirituality as it related to posttraumatic growth (Q_R (5df) = 46.80, $p < .05$). Participation in a college setting significantly predicted a stronger effect size between spirituality and posttraumatic growth than participation in a community setting. Setting did not, however, significantly moderate the relationship between social support and posttraumatic growth (Q_R (5df) = 1.84, $p > .05$). Across settings, effect sizes between resilience factors and posttraumatic growth were positive.

Trauma Moderators

Table 10 also presents findings from the analysis of trauma variables as moderators of the relationships between each resilience factor and posttraumatic growth. Trauma type significantly moderated the effect sizes of both social support (Q_R (5df) = 9.19, $p < .05$) and spirituality (Q_R (5df) = 45.33, $p < .05$) as they related to posttraumatic growth. Social support showed a stronger relationship to posttraumatic growth in the

Table 10. Setting and Trauma Related Moderators of the Relationships between Resilience Factors and Posttraumatic Growth

		Setting														
Variable	Q _R	Community			VA			Medical			College			First Responder		
		k	Beta	ES	k	Beta	ES	k	Beta	ES	k	Beta	ES	k	Beta	ES
Social Support	1.84	7	-.25	.20*	5	.20	.24*									
Spirituality	46.80*	6	-.76	.21							3	.18	.28*			

		Trauma Type														
Variable	Q _R	Natural Disaster			Accident			Mass Conflict			Other Trauma			Combat		
		k	Beta	ES	k	Beta	ES	k	Beta	ES	k	Beta	ES	k	Beta	ES
Social Support	9.19*	3	.07	.26*				3	-.12*	.13*				5	-.00	.24*
Spirituality	45.33*							3	-.89*	.05	5	.02	.32*			

		Time Since Trauma											
Variable	Q _R	0-6 Months			6-11 Months			1-10 Years			More than 10 Years		
		k	Beta	ES	k	Beta	ES	k	Beta	ES	k	Beta	ES
Social Support	3.92				2	.22	.24*	4	.01	.18*	3	.05	.22*
Spirituality	4.52*							3	.63*	.35*	2	-.63*	.01

*p<.05

context of natural disaster and combat than in the context of mass conflict. Social support also related more strongly to posttraumatic growth than did spirituality in the context of mass conflict. Spirituality showed a stronger relationship to posttraumatic growth in the context of other traumatic events such as learning about the death of a loved one than in the context of mass conflict. Across trauma types, effect sizes were positive and, for the most part, statistically significant.

In addition to trauma type, time since the traumatic event occurred was also analyzed as a moderating variable. Time since the traumatic event significantly moderated the effect size of spirituality as it related to posttraumatic growth (Q_R (3df) = 4.52, $p < .05$). The relationship between spirituality and posttraumatic growth was stronger between one and ten years following the traumatic event than it was more than ten years following the traumatic event. Time since trauma did not, however, significantly moderate the effect size of the relationship between social support and posttraumatic growth (Q_R (3df) = 3.92, $p > .05$). Across all time points, effect sizes were positive and, with one exception, statistically significant.

In summary, social support related positively to posttraumatic growth ($r = .21$). This relationship was stronger for samples of participants who were younger, male, and residing in the US than for other participants. The relationship between social support and posttraumatic growth was also stronger among accident and combat trauma survivors than among survivors of other traumatic events. Spirituality also evidenced a positive relationship with posttraumatic growth ($r = .31$), and the effect size was stronger among participants who were older, male, attending college, and residing in the US than among

other participants. This relationship was also stronger in survivors of traumatic events other than natural disaster, accident, mass conflict, assault, or combat. Finally, results from the analysis of time moderators demonstrated that effect sizes for spirituality appeared to decrease over time while effect sizes for social support appeared to remain consistent.

Methodological Moderator Analyses

The seventh research hypothesis posited that effect sizes between resilience variables and all adjustment outcomes which showed significant heterogeneity after accounting for both systematic and random error would be moderated by methodological variables in addition to demographic, setting, and trauma related variables.

Methodological moderators were originally hypothesized to include study design (prospective or retrospective), date of publication, and measurement of resilience and outcome variables. Specifically, studies with a retrospective design were expected to evidence stronger effect sizes than studies with a prospective design because all participants in retrospective studies would be responding to the same traumatic stimulus within the same timeframe. Participants in prospective studies might be responding to different traumatic events within a broader timeframe, possibly leading to more variable reports of posttraumatic adjustment. However, during the coding process it became clear that all studies were conducted retrospectively, following identified traumatic events. Therefore, study design was not included in analyses of moderation. Studies published before the most recent edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV; APA, 1994) were expected to use different criteria for assessing

adjustment and maladjustment than studies published before 1994, possibly resulting in some additional variation in effect sizes. However, during the coding process, it became clear that all studies except one were published after the DSM-IV. All studies except one were therefore conducted based on the same set of criteria defining posttraumatic stress disorder and maladjustment as measured by symptoms of other disorders (e.g., depression). No other notable differences based on publication date were identified. Hypotheses regarding date of publication acting as a moderating variable were therefore revised, and date of publication was not assessed as a potential moderator. Finally, measurement of resilience factors and adjustment outcomes was hypothesized to account for some variance in effect sizes. Moderator analyses concerning measurement are presented below.

Measurement of Resilience Variables

Results of moderator analyses concerning the measurement of resilience variables are presented in Table 11. The instruments used to measure social support, self-esteem, spirituality, and optimism moderated the effect sizes of these resilience factors as they related to each outcome.

Measurement of social support accounted for significant variance in the relationship between social support and adjustment to trauma ($Q_R (1df) = 33.38, p < .05$). Studies measuring social support were coded based on whether they measured self-reported perceptions of social support (perceived support) or self-reports of actual supportive interactions (received support). Studies which measured perceived social support showed significantly stronger effect sizes for the relationship between social

support and adjustment to trauma than studies which measured received support ($\beta = .20, p < .05$). Measurement of support did not account for significant effect size variance in the relationship between social support and psychological adjustment ($Q_R (1df) = .01, \beta = .006, p > .05$) or in the relationship between social support and posttraumatic growth ($Q_R (1df) = .32, \beta = -.10, p > .05$).

Studies measuring self-efficacy were coded based on whether they assessed specific self-efficacy for managing posttraumatic sequelae (coping self-efficacy) or general self-efficacy for navigating life circumstances (general self-efficacy). Measurement of self-efficacy did not account for significant variance in either the relationship between self-efficacy and adjustment to trauma ($Q_R (1df) = .65, \beta = .04, p > .05$) or the relationship between self-efficacy and psychological adjustment ($Q_R (1df) = 1.16, \beta = .04, p > .05$).

Studies measuring self-esteem were coded based on whether they measured self-esteem using the Rosenberg Self-Esteem Scale (Rosenberg, 1965) or using another measure. Instrumentation did not account for significant variance in the relationship between self-esteem and adjustment to trauma ($Q_R (1df) = .76, \beta = -.11, p > .05$). Instrumentation did, however, account for significant variance in the regression model of the relationship between self-esteem and psychological adjustment ($Q_R (1df) = 13.56, p < .05$). Use of the Rosenberg (1965) measure significantly predicted a stronger relationship between self-esteem and psychological adjustment than use of other measures ($\beta = .53, p < .05$).

Table 11. Moderators Related to the Measurement of Resilience Variables in the Relationships between Resilience Factors and Outcomes

Variable	Q _R	Outcome										
		Adjustment to Trauma			Q _R	Psychological Adjustment			Posttraumatic Growth			
		Beta	K	ES		Beta	k	ES	Q _R	Beta	k	ES
Social Support	33.38*	.20*			.01	.01			.32	-.10		
Perceived Support			53	.27*			37	.21*			13	.21*
Received Support			9	.11*			3	.15*			1	.24*
Self-Efficacy	.65	.04			1.16	.04						
Coping Self-Efficacy			14	.42*			8	.52*				
General Self-Efficacy			11	.45*			7	.59*				
Self-Esteem	.76	-.11			13.56*	.53*						
Rosenberg SES			5	.40*			3	.65*				
Other Self-Esteem			9	.44*			7	.44*				
Spirituality	.22	.11							1.39	-.13		
Situational			7	-.09*							5	.31*
Dispositional			6	-.07							6	.31*
Optimism	2.22	-.43			25.59*	-.75*						
Life Orientation Test			9	.27*			6	.36*				
Other Measure			1	.39*			5	.54*				

* p<.05

Studies measuring spirituality were coded based on whether they measured a present state of spiritual awareness and practice (situational spirituality) or a long-term sense of personal spiritual affiliation and regular practice (dispositional spirituality). Measurement of spirituality did not account for significant effect size variation in either the regression model of the relationship between spirituality and adjustment to trauma (Q_R (1df) = .22, $\beta = .11$, $p > .05$) or in the regression model of the relationship between spirituality and posttraumatic growth (Q_R (1df) = 1.39, $\beta = -.13$, $p > .05$).

Studies measuring optimism were coded based on whether they measured optimism using the Life Orientation Test or Life Orientation Test – Revised (Scheier & Carver, 1985; Scheier, Carver, & Bridges, 1994), or using a different measure. Instrumentation did not account for significant variance in the relationship between optimism and adjustment to trauma (Q_R (1df) = 2.22, $\beta = -.43$, $p > .05$). Instrumentation did, however, account for significant variance in the relationship between optimism and psychological adjustment (Q_R (1df) = 25.59, $p < .05$). Use of the LOT significantly predicted smaller effect sizes in this relationship than use of other optimism measures ($\beta = -.75$, $p < .05$).

Measurement of Outcome Variables

Results of moderator analyses concerning the measurement of outcome variables are presented in Table 12. The instruments used to measure adjustment to trauma, psychological adjustment, and posttraumatic growth moderated the effect sizes of these outcomes in their relationships with resilience factors.

Studies measuring adjustment to trauma were coded based on whether the study used a measure based on DSM-IV diagnostic criteria for PTSD (DSM-IV measures) or other criteria of posttraumatic distress (other measures). The directions of each effect size were reversed in order to indicate the relationship between each resilience variable and posttraumatic adjustment, operationalized as a lack of posttraumatic stress symptoms. Instrumentation accounted for significant variance in adjustment to trauma as it related to social support (Q_R (1df) = 27.39, $p < .05$), self-efficacy (Q_R (1df) = 45.70, $p < .05$), and self-esteem (Q_R (1df) = 14.78, $p < .05$). Use of DSM-IV PTSD measures significantly predicted a smaller effect size between social support and adjustment to trauma than use of other PTSD measures ($\beta = -.18$, $p < .05$). Conversely, use of DSM-IV PTSD measures significantly predicted stronger effect sizes than other PTSD measures for both self-efficacy and self-esteem as they related to trauma adjustment ($\beta = .29$ and $\beta = .47$, $p < .05$, respectively). Instrumentation did not account for significant variance in the relationship between spirituality and adjustment to trauma (Q_R (1df) = 2.60, $\beta = .37$, $p > .05$), or in the relationship between optimism and adjustment to trauma (Q_R (1df) = .56, $\beta = -.22$, $p > .05$).

Studies measuring psychological adjustment were coded based on whether the study used a brief symptom inventory (general adjustment), an inventory of depressive symptoms (mood adjustment), or another measure of psychological symptoms (other adjustment). The directions of each effect size were reversed in order to indicate the relationship between each resilience variable and psychological adjustment, which was operationalized as a lack of psychological symptoms. Instrumentation accounted for

Table 12. Moderators Related to the Measurement of Outcome Variables in the Relationships between Resilience Factors and Outcomes

Outcome	Resilience Factor														
	Social Support			Self-Efficacy			Self-Esteem			Spirituality			Optimism		
	Q _R	k	ES	Q _R	k	ES	Q _R	k	ES	Q _R	k	ES	Q _R	k	ES
Adjustment to Trauma	27.39*			45.70*			14.78*			2.60			.56		
DSM-IV		35	.20*		9	.49*		7	.45*		7	-.07		6	.27*
Other PTSD		27	.32*		16	.29*		7	.30*		6	-.13		4	.34*
Psychological Adjustment	74.38*			187.11*			22.38*						4.41		
General Adj.		19	.14*		7	.37*		3	.56*					3	.51*
Depression		16	.41*		6	.79*		5	.41*					3	.40*
Other Adj.		7	.22*		2	.20*		2	.75*					5	.42*
Posttraumatic Growth	.12									34.73*					
PTGI		8	.20*								7	.38*			
Other PTG		6	.22*								4	.04*			

* p<.05

significant variance in psychological adjustment as it related to social support (Q_R (2df) = 74.38, $p < .05$), self-efficacy (Q_R (2df) = 187.11, $p < .05$), and self-esteem (Q_R (2df) = 22.38, $p < .05$). Use of depressive symptom measures significantly predicted stronger effect sizes than other adjustment measures for both social support and self-efficacy as they related to psychological adjustment ($\beta = .55$ and $\beta = .78$, $p < .05$, respectively). However, use of other adjustment measures significantly predicted stronger effect sizes than depressive symptom measures and general adjustment measures in the relationship between self-esteem and psychological adjustment. Instrumentation did not account for significant variance in the relationship between optimism and adjustment to trauma (Q_R (2df) = 4.41, $p > .05$).

Studies assessing posttraumatic growth were coded based on whether they used the Posttraumatic Growth Inventory (PTGI; Tedeschi & Calhoun, 1996) or another measure of posttraumatic growth or benefit finding. Instrumentation accounted for significant variance in posttraumatic growth as it related to spirituality (Q_R (1df) = 34.73, $p < .05$). Use of the PTGI predicted a stronger effect size for this relationship ($\beta = .67$, $p < .05$). Instrumentation did not account for significant variance in posttraumatic growth as it related to social support (Q_R (1df) = .12, $\beta = .06$, $p > .05$).

In summary, measurement variables moderated several of the meta-analytic relationships among resilience factors and adjustment outcomes. With regard to resilience factors, measurement of social support moderated the relationship between social support and trauma adjustment such that stronger effect sizes were found for perceived support than for received support. Similarly, effect sizes between self-esteem

and psychological adjustment were larger when an established self-esteem measure was used than when other measures were used. Effect sizes between optimism and psychological adjustment were smaller when an established optimism measure was used than when other measures were used. With regard to outcomes, measurement of trauma adjustment moderated the effect sizes for social support, self-efficacy, and self-esteem. Specifically, use of DSM-IV PTSD measures significantly predicted a smaller effect size for social support but larger effect sizes for self-efficacy and self-esteem in relation to trauma adjustment than use of other PTSD measures. Measurement of psychological adjustment also moderated the effect sizes for social support, self-efficacy, and self-esteem. Specifically, use of depressive symptom measures significantly predicted stronger effect sizes for both social support and self-efficacy but smaller effect sizes for self-esteem in relation to psychological adjustment than use of other adjustment measures.

Summary of Findings

Together, findings indicate that statistically significant meta-analytic effect sizes emerged for the relationships among resilience factors and adjustment outcomes. With the exception of the relationship between spirituality and trauma adjustment, effect sizes tended to be positive in direction and moderate to large in size. All effect sizes except for the relationship between optimism and trauma adjustment evidenced significant heterogeneity. Weighted least squares regression analyses demonstrated moderator effects based on demographic (i.e., gender, age, nationality, racial and ethnic background), setting (i.e., community, VA, medical center, college, first responder workplace), trauma type (i.e., natural disaster, combat, accident, mass conflict, assault,

combat, other), and time since trauma (i.e., before 6 months to over 10 years) variables.

Implications of these findings are explored in the next chapter.

CHAPTER FIVE

DISCUSSION

A broad body of research concerning resilient adaptation among adult trauma survivors has emerged gradually over the course of the past five decades. In recent years, a multitude of empirical studies have identified resilience factors and explored their relationships with a variety of adjustment outcomes. Research reviews have endeavored to summarize and discuss these findings in light of both cognitive behavioral and ecological systems theoretical perspectives. Within these research reviews, broad ranges of findings have been observed, and discrepancies have been noted. A handful of prior meta-analyses have explored some of these relationships, though some methodological limitations have been uncovered within these studies (e.g., fewer than eight studies included in effect size calculation, Luszczynska, Benight, & Cieslak, 2009; restricting focus to health-related stress rather than traumatic stress, Bostock, Sheikh, & Barton, 2009; combining theoretically distinct outcomes in an effort to assess broader adjustment, Ano & Vasconcelles, 2005). The purpose of the present study was to conduct a methodologically rigorous, theoretically informed, conceptually clear, systematic meta-analysis of the literature concerning the relationships among the widely researched resilience factors of social support, self-efficacy, self-esteem, spirituality, and optimism,

and the adaptive outcomes of trauma adjustment, general psychological adjustment, and posttraumatic growth.

The overarching goal of this meta-analysis was to clarify the nature of these relationships in three different ways. First, a great deal of variability in the size and direction of correlations has been observed in the literature examining the relationships between each resilience factor and each adjustment outcome. The present meta-analysis sought to organize and clarify these discrepant findings by calculating mean effect sizes, examining homogeneity of variance, and assessing the influence of possible moderating variables. Second, while resilience researchers originally hypothesized that fostering individual resilience factors (e.g., self-efficacy) would bolster adaptive functioning following trauma, more recent findings have underscored the importance of enhancing contextual resilience factors (e.g., social support) in promoting adaptive outcomes (e.g., Helgeson & Lopez, 2010). The present study sought to compare the contributions of individual and contextual resilience factors to positive adjustment outcomes following trauma in order to clarify the multilevel systemic nature of resilience processes. Third, national epidemiological studies have reliably shown that less than approximately one third of adults tend to experience significant maladjustment following trauma (e.g., Kessler et al., 1995; Roberts et al., 2011; Resick et al., 2008; Bonanno et al., 2010). Given these findings, resilient adaptation appears to occur frequently across broad and diverse populations of trauma survivors. While prior meta-analyses have examined relationships among multiple risk factors and PTSD (Brewin, Andrews, & Valentine,

2000; Ozer, Best, Lipsey, & Weiss, 2003), the literature concerning relationships among resilience factors and adjustment has not been systematically organized in this way.

Within the current study, these goals were addressed through a systematic meta-analysis of the relationships among individual and contextual resilience factors including social support, self-efficacy, self-esteem, spirituality, and optimism, and adjustment outcomes including adjustment to trauma, psychological adjustment, and posttraumatic growth. Initial literature searches yielded a vast array of studies concerning the relationships among these resilience factors and adjustment outcomes. Among the identified resilience factors, social support was the most frequently studied. As a result, the meta-analytic relationships among social support and adjustment outcomes were based on large enough samples of studies to yield meaningful findings. The individual resilience factors of self-efficacy, self-esteem, spirituality, and optimism were less frequently studied than social support and therefore contribute tentative findings. Among the identified adjustment outcomes, adjustment to trauma was the most frequently studied in relation to resilience factors. Adjustment to trauma was defined as a lack of PTSD symptoms. Psychological adjustment, conceptualized as a lack of general symptoms of depression or distress following trauma, was somewhat less frequently assessed than trauma adjustment. Relatively few studies investigated the relationships among resilience factors and posttraumatic growth. Defined as the experience of personal growth and benefit after trauma, posttraumatic growth emerged only recently in studies of trauma survivors and merits further research attention.

The emerging findings, while based on a relatively small sample of studies, have contributed a set of consistent and informative practical and theoretical insights. As a whole, findings from the present study uncovered statistically significant meta-analytic relationships among resilience factors and adjustment outcomes. In this chapter, findings are discussed within the context of current literature. Clinical and counseling implications are suggested. Limitations are addressed, and future directions are explored.

Mean Effect Sizes among Resilience Factors and Adjustment to Trauma

One major finding in the present study concerns the meta-analytic relationships among resilience factors and adjustment to trauma. In the present meta-analysis, adjustment to trauma was conceptualized as a lack of PTSD symptoms. Social support, self-efficacy, self-esteem, and optimism all showed significant positive effect sizes in their relationships to trauma adjustment. Self-efficacy and self-esteem demonstrated larger effect sizes than social support and optimism. Views of the self as capable and worthwhile may relate more strongly to PTSD symptom reduction than a supportive social network or an optimistic outlook toward the future. Spirituality showed a significant negative effect size in this relationship, indicating that efforts to gain spiritual understanding following trauma may relate to posttraumatic distress. Alternatively, the experience of PTSD symptoms following trauma may lead individuals to seek spiritual explanations. Findings for each resilience factor are considered separately.

Social support evidenced a statistically significant, positive, moderately sized relationship with adjustment to trauma. This finding is largely consistent with both previous research reviews which discussed positive relationships among social support

and posttraumatic adjustment (Helgeson & Lopez, 2010), and prior meta-analyses which demonstrated an inverse relationship between social support and PTSD symptoms (Brewin, Andrews, & Valentine, 2000; Ozer, Best, Lipsey, & Weiss, 2003). This positive relationship between social support and trauma adjustment may indicate that social support tends to be perceived as helpful following trauma (Kaniasty & Norris, 2008; King et al., 2006). There was, however, significant heterogeneity among the contributing effect sizes, which ranged from $r = -.14$ to $r = .59$ in the current meta-analysis. The emergence of negative effect sizes may indicate that social support may not always be perceived as positive following trauma (Ullman, 1999). Perceptions of negative social support may serve to exacerbate posttraumatic adjustment difficulties (Borja, Callahan, & Long, 2006), particularly among individuals who tend to perceive social interactions negatively across situations (Borja, Callahan, & Rambo, 2009).

Self-efficacy showed a large, statistically significant, positive relationship with adjustment to trauma. This finding is consistent with a social cognitive theory of posttraumatic recovery (Benight & Bandura, 2004), which states that self-efficacy beliefs enhance appraisals of the self as capable of coping and, in doing so, enable individuals to engage in a variety of effective coping efforts. However, significant heterogeneity emerged among the contributing effect sizes in the present analysis, which ranged from $r = .00$ to $r = .75$. While null findings may indicate that self-efficacy may be unrelated to the process of adjustment following trauma (Morina & Von Collani, 2006), positive correlations may demonstrate the importance of self-efficacy beliefs in enhancing adaptation.

Self-esteem evidenced a large, statistically significant, positive relationship with adjustment to trauma. This finding is consistent with theoretical formulations of self-esteem as a self-valuing process which tends to enhance adjustment and minimize symptoms of maladjustment following trauma (Pyszczynski et al., 2004). Similarly, reviews of the self-esteem research have consistently reported positive relationships between a healthy, stable, positive sense of self-esteem and adjustment to stress (Zeigler-Hill, 2011). However, significant heterogeneity emerged among the contributing effect sizes, which ranged from $r = -.12$ to $r = .64$. The emergence of negative effect sizes may indicate that for some individuals, self-esteem may be unstable or fragile and in need of consistent external validation that may be difficult to find and may complicate adjustment efforts following trauma (Zeigler-Hill, 2011; Crocker & Park, 2004).

Spirituality showed a small but statistically significant negative relationship with adjustment to trauma. The empirical literature concerning this relationship has documented mixed findings. While several studies have demonstrated positive relationships between spirituality and trauma adjustment, several additional studies have demonstrated negative relationships between these constructs (Chen & Koenig, 2006). Reviews of the research have found that while spirituality may confer a sense of positive meaning, connectedness, and comfort, it may also lead to a sense of questioning, guilt, and unease (Pargament & Cummings, 2010). Findings from the current meta-analysis are consistent with a process of spiritual struggling marked by difficulty adjusting following trauma. Given the small size of the relationship, though, the spiritual struggling and

difficulty adjusting are likely minimal, and spirituality likely has a very small relationship to the process of trauma adjustment.

Optimism demonstrated a statistically significant, positive, medium effect size in relation to trauma adjustment. This finding is largely consistent with theoretical formulations of optimism as a positive outcome expectancy which can enhance efforts to cope and adjust in the face of challenging or traumatic life circumstances (Scheier & Carver, 1985). Similarly, systematic reviews of the research have consistently reported positive relationships between optimism and use of effective coping efforts (Nes & Segerstrom, 2006). In the current study, contributing effect sizes ranged from $r=.12$ to $r=.39$. Since significant variability did not emerge among these effect sizes, the meta-analytic relationship between optimism and trauma adjustment may indicate that positive optimistic thinking may facilitate the process of adjustment for a diverse population of people across a wide range of settings following a variety of traumatic events over time.

Mean Effect Sizes among Resilience Factors and Psychological Adjustment

A second major finding in the present study concerns the meta-analytic relationships among resilience factors and general psychological adjustment. In this study, general psychological adjustment was conceptualized as a lack of depressive symptoms or a lack of symptoms of global psychological distress. Social support, self-efficacy, self-esteem, and optimism all showed significant positive effect sizes with psychological adjustment. With the exception of social support, the effect sizes for the relationships among resilience factors and psychological adjustment were stronger than the effect sizes for the relationships among resilience factors and trauma adjustment.

This finding may indicate that these resilience factors are more promotive of a global adjustment process than of a focused effort to adjust from PTSD symptoms. In addition, the individual resilience factors of self-efficacy, self-esteem, and optimism demonstrated larger correlations with psychological adjustment than the contextual resilience factor of social support. Therefore, participation in a supportive social context may not relate to reduced psychological distress as strongly as positive beliefs about the self and the future. Due to a small number of studies examining the effect size between spirituality and psychological adjustment ($k=8$), this effect size was not included in the meta-analysis. Findings for each resilience factor are considered separately.

Social support evidenced a statistically significant, positive, moderately sized relationship with psychological adjustment. The mean effect size for this relationship was similar in both direction and magnitude to the mean effect size for the relationship between social support and trauma adjustment. Given the frequency of co-occurring PTSD and general maladjustment (Kessler et al., 1995; Schnurr, Friedman, & Bernardy, 2002; Breslau, 2002), the similar direction and magnitude of these effect sizes is not surprising. The positive relationship between social support and psychological adjustment is consistent with findings described in reviews of the research (e.g., Helgeson & Lopez, 2010; Thoits, 1986). There was, however, significant heterogeneity among the contributing effect sizes, which ranged from $r=.00$ to $r=.65$ in the current meta-analysis. Null effect sizes may indicate that social support does not relate to general distress following trauma, though the emergence of only one contributing effect

size below $r=.10$ may also indicate that this null effect was unique to the population of Taiwanese college students in which it was measured (Heppner et al., 2006).

Self-efficacy showed a large, statistically significant, positive relationship with general psychological adjustment. While self-efficacy related positively to a lack of PTSD symptoms, it evidenced a stronger relationship with a lack of general distress. While significant heterogeneity emerged among the contributing effect sizes, all were positive and statistically significant, with a range from $r=.14$ to $r=.72$. The large magnitude of this mean effect size indicates that self-efficacy may be particularly related to reduced general psychological distress following trauma, a finding consistent with a social cognitive theory of posttraumatic adjustment (Benight & Bandura, 2004).

Self-esteem also evidenced a large, statistically significant, positive effect size with general psychological adjustment. The large magnitude of this effect size indicates that self-esteem, like self-efficacy, may be particularly beneficial in reducing general psychological distress following trauma (Zeigler-Hill, 2011). While self-esteem related positively to a lack of PTSD symptoms, it appeared to relate more strongly to a lack of general psychological distress. All contributing effect sizes were positive and statistically significant, with a range from $r=.24$ to $r=.68$. It may be that the process of pursuing self-esteem does not detract from general psychological adjustment (Crocker & Park, 2004).

Optimism also demonstrated a statistically significant, positive, large effect size in relation to general psychological adjustment. While significant heterogeneity emerged among the contributing effect sizes, all were positive and statistically significant with a range from $r=.13$ to $r=.55$. This finding remains consistent with theoretical formulations

of optimism as a positive outcome expectancy which can enhance efforts to cope and adjust in the face of challenging or traumatic life circumstances (Scheier & Carver, 1985). While optimism relates positively to a lack of PTSD symptoms, it appears to relate more strongly to a lack of general psychological distress.

Mean Effect Sizes among Resilience Factors and Posttraumatic Growth

A third major finding in the present study concerns the meta-analytic relationships among resilience factors and posttraumatic growth. In the current study, posttraumatic growth was conceptualized as the experience of positive benefit and personal thriving following a traumatic event. Only social support and spirituality contributed enough effect sizes in their relationships to posttraumatic growth for further analysis. Both of these resilience factors showed significant positive meta-analytic effect sizes. Findings for social support and spirituality are considered separately.

Social support evidenced a statistically significant, positive, small relationship with posttraumatic growth. The mean effect size for this relationship was similar in both direction and magnitude to the mean effect sizes for both the relationship between social support and trauma adjustment and the relationship between social support and general psychological adjustment. Therefore, it appears that social support relates not only to lack of PTSD symptoms and lack of general distress, but also to the experience of growth and benefit following trauma. This finding is consistent with previous studies that have uncovered a positive relationship between social support and growth following trauma (e.g., Frazier et al., 2004). There was, however, significant heterogeneity among the contributing effect sizes, which ranged from $r = -.22$ to $r = .38$ in the current meta-analysis.

The emergence of a negative effect size may indicate that social support may not be perceived as conducive to growth following trauma. Instead, when social interactions are perceived as negative in nature, trauma survivors may report a sense of being stuck with distressing memories rather than a sense of growth.

Spirituality showed a moderate, statistically significant, positive relationship with posttraumatic growth. This finding is consistent with both theories of spirituality (Pargament & Cummings, 2010) and previous findings concerning the relationship between spirituality and posttraumatic growth (e.g., Frazier et al., 2006). However, theories of posttraumatic growth have included spiritual benefit as one dimension of growth following trauma, and inventories of posttraumatic growth include some items designed to measure spiritual growth (Tedeschi & Calhoun, 1996). As a result, the meta-analytic association between spirituality and posttraumatic growth may be partially explained by the theoretical and empirical overlap between these constructs. In addition, significant heterogeneity emerged among the contributing effect sizes, which ranged from $r = -.20$ to $r = .49$. The emergence of negative effect sizes may indicate that some individuals struggle with gaining a sense of spiritual understanding and meaning following trauma. However, the majority of contributing effect sizes were positive. The process of gaining a spiritual understanding of life following trauma may be particularly conducive to posttraumatic growth. In fact, spirituality may relate more strongly to posttraumatic growth processes than to initial trauma adjustment.

Together, these findings demonstrate that the resilience factors of social support, self-efficacy, self-esteem, spirituality, and optimism relate meaningfully to trauma

adjustment, psychological adjustment, and growth following trauma. Across these findings, the individual resilience factors of self-efficacy and self-esteem evidenced stronger relationships to adjustment indices than the contextual resilience factor of social support.

Moderator Analyses

A fourth major finding in the present study concerns moderators of the meta-analytic relationships among resilience factors and adjustment outcomes. With the exception of the relationship between optimism and adjustment to trauma, all meta-analytic relationships showed significant heterogeneity among contributing effect sizes. Moderator analyses revealed that demographic, measurement, setting, trauma type, and time since trauma variables accounted for significant variance among effect sizes. With regard to demographic moderators, a majority of the effect sizes were larger among male populations than among female populations. This effect appeared to be most pronounced for self-efficacy beliefs in relation to trauma adjustment and psychological adjustment. Self-efficacy accounted for 52% of the variance in trauma adjustment for men and only 7% of the variance for women. Similarly, self-efficacy accounted for 67% of the variance in psychological adjustment in men and 12% in women. Men may be more likely to endorse self-efficacy beliefs (Benight & Bandura, 2004) and less likely to experience maladjustment (Brewin, Andrews, & Valentine, 2000) than women. With regard to age, all of the resilience factors appeared to be more promotive of both trauma adjustment and psychological adjustment among older populations (over age 35) than among younger populations (age 18-34). It may be that resilience processes occur along a developmental

trajectory, with resilience factors relating more strongly to adjustment over time. As age increases, adults may develop longstanding supportive social networks and refine their beliefs about their coping capabilities, self-worth, spirituality, and positive future possibilities. In turn, these supportive relationships and positive beliefs may promote adjustment following trauma.

Moderating effects for racial and ethnic background were statistically significant yet less pronounced than the effects for gender and age across the relationships between resilience factors and adjustment outcomes. Trends in the findings indicated that the individual resilience factors were more promotive of both trauma adjustment and psychological adjustment among Caucasian samples than among minority samples. This effect appeared to be the most pronounced for the relationship between self-efficacy and lack of PTSD symptoms. Within this relationship, self-efficacy accounted for 8% of the variance in trauma adjustment among racial and ethnic minority samples and 38% of the variance in trauma adjustment among Caucasian samples. Reviews of the research have indicated that participants from cultural majority groups may be more likely to endorse self-efficacy beliefs than members of demographic minority groups (Hobfoll, Schröder, Wells, & Malek, 2002). However, findings also indicated that social support was more promotive of trauma adjustment among racial and ethnic minority individuals than among Caucasian individuals. Minority group members may find support from social and cultural groups to be particularly helpful in the processes of regaining lost resources and healing from trauma (Castro & Murray, 2010). Moderating effects for nationality were also statistically significant yet less pronounced than the effects for gender and age.

The most pronounced moderating effect for nationality occurred in the relationships between social support, trauma adjustment, and psychological adjustment. Within these relationships, social support appeared to be more promotive of adjustment among US samples than among international samples. It may be that individuals residing in the US report more benefit from social support in times of stress than their international peers.

The effects of setting and trauma type moderators evidenced some variability across the meta-analytic effect sizes. Specifically, social support related more strongly to both trauma adjustment and psychological adjustment among combat trauma survivors and in VA settings than among survivors of other traumas located in other settings. It may be that support and cohesion among military veterans augments military cultural values such as teamwork and unit cohesion, and is particularly helpful in the process of adjustment following military combat trauma (Taft, Stern, King, & King, 1999).

Perceived support also appeared to be more promotive of adjustment than received support. Self-efficacy and optimism were more strongly related to trauma adjustment and psychological adjustment among accident survivors in medical settings than among survivors of other traumatic events in other locations. Self-efficacy for completing a defined path of sequential recovery tasks and a positive optimistic outlook toward recovery, particularly within a controlled medical environment, may relate more strongly to adjustment than self-efficacy and optimism in chaotic circumstances. Self-esteem was more strongly related than the other resilience factors to trauma adjustment and psychological adjustment following assault. It may be that the experience of an interpersonal trauma such as assault is particularly damaging to self-esteem (Resick et al.,

2008), and a stable sense of positive self-esteem may be especially promotive of adjustment following interpersonal trauma. Spirituality related more strongly to posttraumatic growth than to trauma adjustment. While spirituality accounted for only 1% of the variance in adjustment to trauma, it accounted for approximately 10% of the variance in posttraumatic growth. It may be that traumatic experiences tap into dimensions of spirituality such as mortality and guilt. The process of coming to a sense of spiritual understanding regarding these dimensions may relate to the experience of personal growth and benefit (Pargament & Cummings, 2010) more strongly than to the process of adjusting to distress.

Moderating effects for time since trauma indicated that resilience factors tended to relate more strongly to adjustment outcomes in the acute time period (less than six months following trauma) than across more chronic time periods. This finding may indicate that resilience factors are more promotive of adjustment shortly following a traumatic event than over time.

In summary, moderator analyses showed that the relationships among resilience factors and adjustment outcomes tend to vary across demographic characteristics, settings, trauma types, and time since trauma. Moderator effects for gender, age, race, and nationality were consistent across effect sizes, with participants who were male, older, Caucasian, and residing in the US showing larger effect sizes than participants who were female, younger, racial and ethnic minority group members, and residing in international locations. Moderator effects for setting, trauma type, and time evidenced notable variability.

General Discussion

In the present meta-analysis, positive relationships were found among resilience factors and adjustment outcomes. The single exception to this finding was the small negative relationship between spirituality and adjustment to trauma. This finding may indicate that engaging in the spiritual meaning making process may represent more of a spiritual struggle than a spiritual adjustment activity. Given the positive relationship between spirituality and posttraumatic growth, spirituality may relate to perceived benefit and the experience of personal thriving once initial spiritual struggles resolve.

Self-efficacy and self-esteem demonstrated the largest effect sizes with adjustment to trauma and psychological adjustment. These individual resilience factors involve views of the self as capable and worthwhile, and may be particularly important in reducing symptoms of PTSD and general psychological distress. Social support demonstrated small to medium effect sizes in relation to adjustment to trauma and psychological adjustment. Perceptions of the social network as warm, accepting, and supportive of recovery may be helpful in reducing symptoms of PTSD and general distress. However, a supportive social context did not relate as strongly to adjustment outcomes as individual self-efficacy and self-esteem. One potential reason for this finding may be that both trauma adjustment and psychological adjustment were measured by individual symptom reports (Waller, 2001). Social support may relate more strongly to measures of social adjustment than to individual perceptions of symptoms. Another potential reason for this finding may be that individuals who endorse measures of coping self-efficacy and self-esteem may be unlikely to endorse symptoms of maladjustment.

In keeping with an ecological systems theory perspective, measurement of adjustment across both individual and social systems may contribute to a more complete understanding of the relative importance of individual and contextual resilience factors to the process of adjustment following trauma. While social support may be beneficial in building a sense of connection and cohesion, it may be that self-efficacy and self-esteem relate more strongly to engaging in personal recovery efforts such as completing concrete coping tasks. Systemically informed interventions, then, may be most effective by focusing on fostering individual resilience factors within a warm and supportive social context.

Clinical and Counseling Implications

These emerging findings highlight several clinical and counseling implications. Trauma-focused treatment efforts administered in the VA and serving marginalized military populations may be most effective when social support is integrated into sessions. Current evidence based treatments may be augmented by adding social activities to exposure therapy (Prolonged Exposure, or PE; Foa & Rothbaum, 1998), or by focusing on social perceptions during cognitive restructuring interventions (Cognitive Processing Therapy, or CPT; Resick & Schnicke, 1993). Treatment efforts may also be greatly enhanced by including opportunities for trauma survivors to build a sense of self-efficacy and competence across recovery domains. Opportunities for mastery of recovery tasks are collaboratively communicated in most current evidence-based treatment protocols. In addition, trauma-focused treatments for survivors of interpersonal trauma may be most effective when attention is given to assessing and enhancing self-esteem. Current

evidence based treatments such as CPT incorporate session time to discussing the impact of trauma on self-esteem and conducting interventions designed to enhance self-esteem (Resick & Schneike, 1993). The experience of trauma often introduces spiritual questions across themes including mortality, forgiveness, and guilt. Discussions of spirituality and related themes may be most effective later in treatment. Once initial symptoms of maladjustment have remitted, focusing on broader spiritual meanings may enhance personal growth and benefit. Finally, trauma-focused treatments in acute recovery settings may be augmented by efforts to build a positive and optimistic outlook toward recovery. It may be important to build optimism both at the beginning of treatment through motivational interviewing, and at the end of trauma-focused treatment during the termination process.

Limitations

While findings from the present meta-analysis add to the body of research concerning resilient adaptation following trauma, there are several methodological and theoretical limitations. Methodologically, the current study included only published articles. Since published articles may be more likely than unpublished research to include statistically significant findings, the meta-analytic effect sizes may be inflated. Similarly, there were too few studies to calculate several of the hypothesized meta-analytic relationships, particularly among resilience factors and posttraumatic growth. Inclusion of a greater number of studies, both published and unpublished, may have allowed for analysis of these effect sizes. In addition, the present meta-analysis reported findings from studies of diverse populations. However, a large percentage of the total

population reported a Caucasian racial and ethnic background. Therefore, results of this meta-analysis may generalize more readily to Caucasian individuals than to individuals from other backgrounds. Finally, measurement of both adjustment to trauma and general psychological adjustment were based on a lack of reported symptoms. Adjustment processes may be more fully conceptualized as not only lack of symptoms, but also positive engagement in a variety of life experiences (e.g., social relationships, positive emotions; Luthar et al., 2006; Rutter, 2012), and may benefit from being measured accordingly.

In addition to methodological limitations in resilience research, several theoretical concerns have emerged. Reviews of resilience research have underscored the importance of ecological systems theory (Bronfenbrenner, 1977). This theoretical perspective accounts for multiple systems and levels of biopsychosocial interactions in the theoretical conceptualization and empirical examination of resilience across the lifespan (Luthar, Cicchetti, & Becker, 2000; Davydov et al., 2010) and within the context of traumatic life events (McKeever & Huff, 2003). However, very few studies have embedded findings within either this or alternative theoretical perspectives. As a result, definitions of resilience, adaptation, and posttraumatic growth continue to vary substantially across studies (Zoellner & Maercker, 2006). Findings concerning the relationships among these variables also tend to show notable variability. Consistent, theoretically informed definitions and measurement strategies of resilience and posttraumatic growth across studies would inform a more complete understanding of similarities and differences among these phenomena.

Similarly, the present meta-analysis reported findings from retrospective cross-sectional studies of resilience following trauma. While these findings provide an understanding of the correlations between resilience factors and adjustment outcomes, the results do not inform a theoretical understanding of resilience processes over time. Prospective studies which measure resilience factors before and after the experience of trauma among at-risk groups would enrich theoretical conceptualizations of resilience mechanisms and inform the development of effective preventive interventions. Further, longitudinal studies which measure resilience factors over time would illustrate whether resilience factors lead to a reduction in symptoms of maladjustment (e.g., social causation; Norris & Kaniasty, 1996) or whether symptoms of maladjustment lead to reduced engagement in resilience processes (e.g., social determination; Kaniasty & Norris, 2008).

Future Directions

The literature concerning resilience has reached a point of multisystem and multilevel integration (Masten, 2011; Luthar, 2006). Future research efforts may enhance this integration by uncovering not only individual and social resilience factors, but also biological correlates, community relationships, and cultural supports that aid in the processes of posttraumatic adjustment and growth. In light of the correlations among resilience factors and adjustment, future research may investigate ways of adapting current interventions in an effort to enhance social support and promote self-efficacy, self-esteem, spirituality, and optimism among trauma survivors. In addition, the development and evaluation of preventive interventions designed to enhance resilience among individuals at risk for experiencing trauma remains a fertile area for ongoing

study, as prevention research and practice may be particularly helpful in reducing the incidence of posttraumatic maladjustment among at-risk individuals.

Given the findings of the present meta-analysis, future research efforts may focus on investigating the contributions of self-efficacy and self-esteem to posttraumatic adjustment. It may be that these resilience factors, in particular, enhance engagement in recovery tasks and facilitate adaptive outcomes among trauma survivors. In addition, adding outcome indicators of individual and social adjustment above and beyond lack of symptoms may further enhance conceptualizations of posttraumatic adaptation. Finally, longitudinal and prospective studies would inform both theoretical understandings and practice efforts designed to enhance resilience.

Conclusions

The present meta-analysis sought to uncover and explore effect sizes for the relationships among resilience factors and adjustment outcomes. Findings showed that social support, self-efficacy, self-esteem, spirituality, and optimism related positively to trauma adjustment, general psychological adjustment, and posttraumatic growth. By uncovering the meta-analytic relationships between these resilience factors and adjustment outcomes, these findings bring some initial clarity to the understanding of posttraumatic adaptation and growth among adult trauma survivors. At the same time, these findings highlight areas in need of future research attention. As the fourth wave of resilience research moves toward integration and understanding, efforts to clarify terms, distinguish among different adaptive processes, develop preventive interventions, and explore resilience over time will be needed.

APPENDIX A:
CODEBOOK

Lifespan Resilience to Trauma Meta-Analysis (2012)**CODE BOOK (DRAFT #2 – 2/17/12)****Coder:** _____**SOURCE INFORMATION**

Authors: _____

Title: _____

Journal: _____

Year: _____ Volume (Issue): _____ Pages: _____

DEMOGRAPHIC INFORMATION

Total Number (N): _____

Gender: Number Men: _____ % Men _____

Number Women: _____ % Women _____

Race/Ethnicity: Number (and %) of:

African American/Black: _____ (_____ %)

American Indian/Alaska Natives: _____ (_____ %)

Asian American/Pacific Islanders: _____ (_____ %)

Hispanic American/Latino/a: _____ (_____ %)

White/Caucasian: _____ (_____ %)

Mixed Race: _____ (_____ %)

Other: _____ (Please Specify: _____)

Age: Mean: _____ SD: _____ Range: _____ to _____

Socioeconomic Status: Summarize indicators used in study:

SETTING Number of participants who are members of the following research populations

1. Community Population: _____

Describe community: _____

2. Veteran Population: _____

Describe era: _____

3. Non-VA Hospital or Medical Population: _____

Specify if medical condition: _____

4. College Student Population: _____

5. Other: _____ (Specify _____)

Setting: Check One: Urban: _____ Rural: _____ Other _____

Unknown: _____

STUDY DESIGN. Check one of each and specify:

Groups: Within Group: _____ (Group: _____)

Between Groups: _____ (Groups: _____)

(Note—code as between group, if analyses were done separately for race/ethnicity, gender, trauma survivors and controls, etc.)

Combined _____ (i.e., did not analyze separately by race/ethnicity)

Timing: Retrospective: _____ (Time since Trauma: _____)

Prospective: _____ (Time before Trauma: _____)

Theory tested? No _____ Yes _____

Specify theory: _____

TRAUMA TYPE Specify number of participants who reported following traumas

1. Natural Disaster: _____

Specify disaster: _____

2. Combat: _____

Specify conflict: _____

3. Mass Conflict or Displacement: _____

Specify: _____

4. Physical Assault: _____

Specify if childhood or adult: _____

5. Sexual Assault: _____

Specify if childhood or adult: _____

6. Interpersonal Violence: _____

7. Motor Vehicle Accident: _____

VARIABLES: (Indicate names of all variables analyzed in the study):

1. _____

2. _____

3. _____

4. _____

5. _____

6. _____

7. _____

MEASUREMENTS. (Code the following information for each variable that is relevant to the study. Use the variable numbers above)

Variable# : _____

How Operationalized: _____

Type of Variable: ☐ Predictor ☐ Outcome ☐ Other: _____

Classification of Variable (refer to classification scheme): _____

Name of Instrument: _____

Reference: _____

Name of Scale: _____

Reliability Estimates

Test-Retest: $r =$ _____ Interval: _____ Source: Study or Cited

Reference (if cited): _____

Internal Consistency: $r =$ _____ Source: Study or Cited

Reference (if cited): _____

Descriptive Statistics: Record Mean (M), Standard Deviation (SD), Potential Range (PR), and Obtained Range (OR) below. If provided separately by group, record above information for each group.

(Use as many copies of this page as necessary)

EFFECT SIZES (bivariate correlations). Code correlations between variables in the study. If correlations are reported separately for different groups, code for each group. If the r was obtained by converting from another statistic, indicate the original statistic.

Example

Social Support (1) and Posttraumatic Growth (2): $r = .40$, $N = 194$ (converted from d)

Men: $r = .40$; Women: $r = .41$

For all predictors, list each variable in the first column, and report the bivariate correlations for all other variables (listed in a separate column across the top). In addition, insert an image of the correlation matrix (if available) directly from the article.

Predictor	Outcome 1	Outcome 2	Outcome 3

(INSERTED IMAGE OF CORRELATION MATRIX GRABBED FROM ARTICLE)

(Use as many copies of this page as necessary)

COMMENTS AND OTHER NOTES:**NEW REFERENCES:**

APPENDIX B:
CLASSIFICATION SCHEME

Resilience Meta-Analysis (2012)

CLASSIFICATION SCHEME (Classify resilience and outcome variables according to the following scheme)

1. Resilience Variables

1. Social Support

- a. Perceived support from family
- b. Perceived support from non-family (e.g., peer, friend, community)
- c. Received support
- d. Satisfaction with social support
- e. General, unspecified, or global social support
- f. Other social support: _____

2. Self Efficacy

- a. Coping self efficacy
- b. Mastery self efficacy
- c. General, unspecified, or general self efficacy
- d. Other self efficacy: _____

3. Self Esteem

- a. Self esteem, self worth, or self value
- b. General, unspecified, or global self esteem
- c. Other self esteem: _____

4. Spirituality

- a. Positive religious coping
- b. Negative religious coping
- c. Spiritual practice (e.g., attending services, prayer, reading)
- d. Spiritual relationships (e.g., closer to higher power)
- e. General, unspecified, or global religiosity or spirituality
- f. Other spirituality: _____

7. Optimism

- b. Optimism, positive outlook
- c. General, unspecified, or global optimism
- e. Other optimism: _____

8. Other Resilience Variable: _____

Resilience variables should be classified by a series of 2 numbers and 1 letter. The first number indicates the type of variable (resilience factor or outcome). The second number indicates the subtype. The letter indicates the specific subtype. **For example,** a classification of 1.2.a would be read “Resilience variable – Self Efficacy – Mastery Self Efficacy”

2. Outcome Variables

1. Adjustment to Trauma
 - a. PTSD symptoms (reversed)
 - b. General, unspecified, or global adjustment to trauma
 - c. Other adjustment to trauma: _____
2. Psychological Adjustment
 - a. Psychological Adjustment or Mental Health
 - b. Brief or global inventory of psychological symptoms (reversed)
 - c. Depression score (reversed)
 - e. General, unspecified, or global maladjustment (reversed)
 - e. Other psychological adjustment: _____
3. Posttraumatic Growth
 - a. Posttraumatic Growth
 - b. Benefit Finding
 - c. General, unspecified, or global posttraumatic growth
 - d. Other posttraumatic growth: _____
4. Other Outcome: _____

Outcome variables should be classified the same way as support and barrier variables: by a series of 2 numbers. The first number indicates the type of variable (resilience variable or outcome). The second number indicates the subtype. The letter indicates the specific subtype.

For example, a classification of 2.1.a would be read “Outcome variable – Adjustment to trauma – PTSD symptoms reversed”

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VITA

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